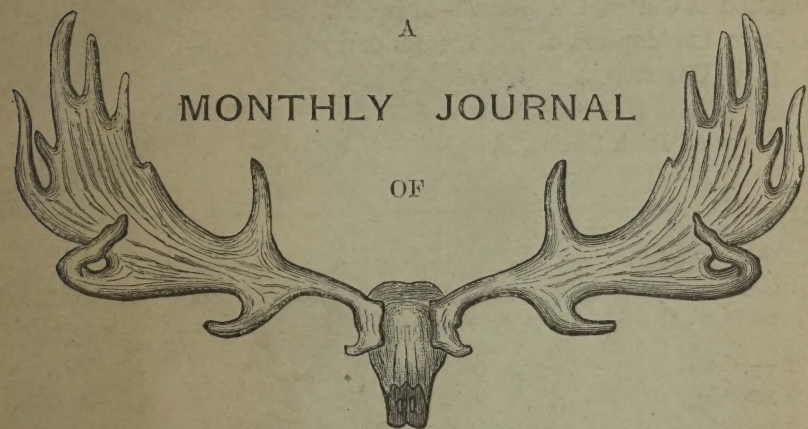


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The Irish Naturalist



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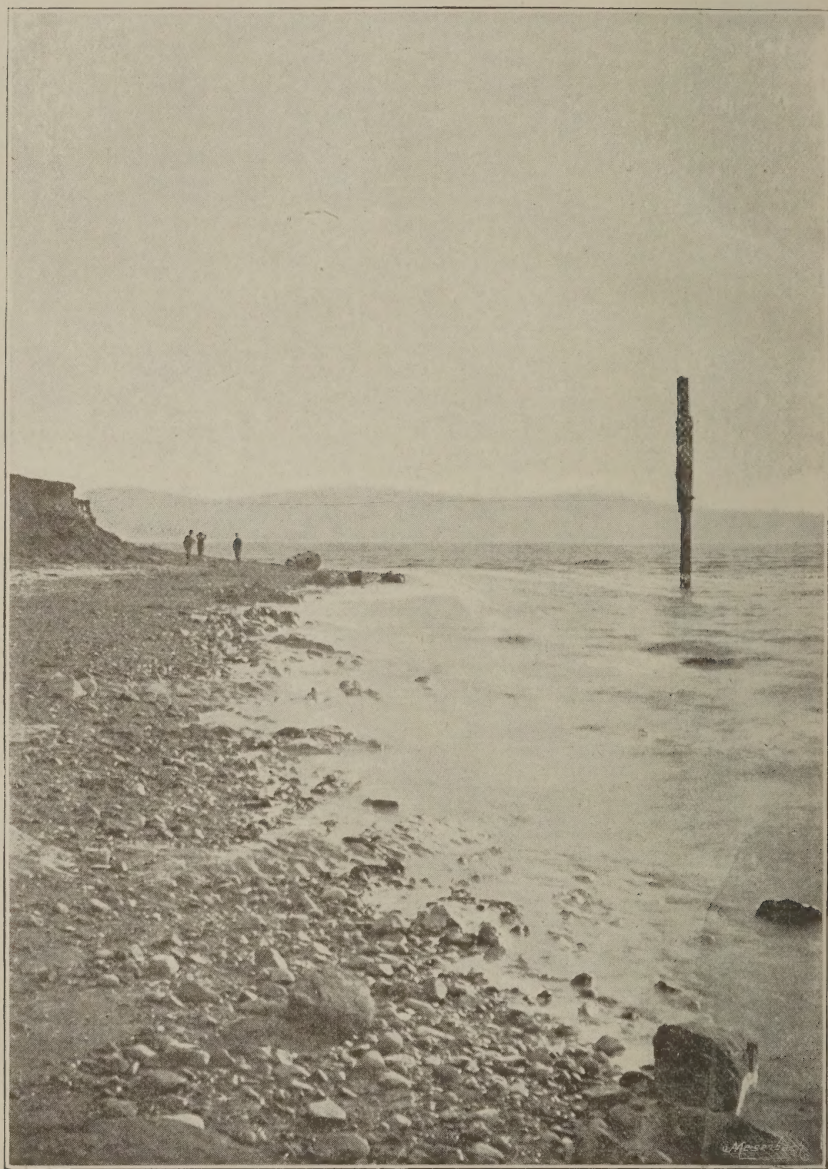
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The Irish Naturalist.

VOL. II.

JANUARY, 1893.

No. I.

IS THE FROG A NATIVE OF IRELAND?

BY R. F. SCHARFF, PH.D., B.SC.

THE following paper does not profess to answer this question decidedly in the affirmative, but I venture to think that I shall be able to show that the belief generally held that the Frog has been introduced by man, is not supported by sufficient evidence.

In an inquiry into the origin of any Irish animal we naturally consult first Thompson's standard work on the Natural History of Ireland,¹ and in the case of the Frog we find that the author had no doubt that it had been artificially introduced into this country, and that it was therefore no true native. His belief appears to be principally founded on a passage referring to Ireland by St. Donatus,² who died in the year 840, of which the following lines are a translation :—

“ No savage bear with lawless fury roves,
No raging lion through her sacred groves,
No poison there infects, no scaly snake
Creeps through the grass, no croaking frog annoys the lake.”

Thompson also refers to an introduction of the Frog, which does certainly seem to have taken place some time about the year 1699, when Dr. Guithers, one of the Fellows of Trinity College, Dublin, placed spawn from England in a ditch in the University Park, whence the species is supposed to have spread all over Ireland.

But Thompson, without comment, also quotes this passage from Stuart's History of Armagh : “ The first Frog that was ever seen in this country made its appearance in a pasture

¹ W. Thompson, “The Natural History of Ireland,” vol. iv., 1856.

² Camden's “Britannia,” vol. vi., p. 234, Gough's edition.

field, near Waterford, about the year 1630, and is noticed by Colgan in a work printed in 1647." It appears, therefore, that before the introduction of the Frog into Dublin, it already existed in Waterford.

Before further consideration of this evidence, a few remarks on the Frog and its geographical range may not be out of place. The Frog is certainly a most useful animal to man, living as it does largely on slugs and insects destructive to crops, but as it is often believed to be a fruit-eater it is generally killed when found in strawberry-beds, which it frequents in order to eat the small black slug, *Arion hortensis*, which commits such ravages among the ripe fruit.

All frogs which have been hitherto discovered in Ireland are of the species known as the Common Frog (*Rana temporaria*, L.), but in England the Edible Frog (*Rana esculenta*, L.), occurs also. One of the most characteristic features by means of which these two species may be distinguished, is the dark triangular patch behind the eye in the Common Frog. This latter varies very considerably in colour, between grey, yellowish, and light brown, and, as a rule, the male is darker than the female.

The Edible Frog has a limited distribution in the British Isles, occurring only in some of the eastern counties of England. The Common Frog, on the other hand, is found all over England, Scotland, and Wales. Both species have a very wide general distribution—the Edible Frog ranging into Northern Africa, and from Eastern Europe, across Palestine and Persia, into China and Japan. The more northern of the two is certainly the Common Frog, and while it ascends the Alps to a height of 9,000 feet,³ the Edible Frog is seldom found higher than 3,000. This seems to indicate that the former is able to resist greater extremes of temperature than the other, but it may mean also that it is the more ancient species of the two.

It is generally acknowledged that many of the quick-breeding mammals, and also some fishes, are easily introduced artificially into districts which they have not previously inhabited, provided that they find similar conditions to those to which they are accustomed. But even in the case of vertebrate animals, many resist artificial introduction, although the

³ J. von Bedriaga, "Die Lurchfauna Europa's" (part I.), 1891.

general surroundings and climate may be perfectly suited to their requirements.

In invertebrate animals artificial introduction almost invariably fails. The Journals of Natural History Societies abound in records of the details of such attempts, and surprise is often expressed at the fact that not a single specimen has survived after a year or two, out of the dozens which were set at liberty.

Now anyone would suppose that it must be a very easy thing to introduce the Edible Frog into such a country as England, for its range all over Continental Europe proves that it must be indifferent as to whether the climate is wet or dry. Yet although about 2,000 living specimens, and a great quantity of spawn were brought by Mr. Berney⁴ from France (he not being aware that the Italian variety of the Edible Frog already existed in the country), and deposited in the ponds and ditches of Norfolk, between the years 1837 and 1842, very few remain in the neighbourhood at the present day, after fifty years, to tell the tale. They have not spread, either, to any of the surrounding counties, for, curiously enough, although the Edible Frog is common in some of the eastern counties of England, Mr. Boulenger⁵ points out that all the specimens, the capture of which has hitherto been recorded, are not the descendants of those introduced by Mr. Berney, but are of Italian type and origin. The suggestion that the Italian type of the Edible Frog has been introduced at a much earlier date than the French type, by monks from Italy, appears to Mr. Boulenger⁵ to be the most plausible explanation, but how the poor monks in the good old days could have carried live frogs or even spawn from Italy, with the primitive means of conveyance then at their disposal, he leaves us to imagine!

Mr. Berney's ignorance of the pre-existence of the Edible Frog in the very neighbourhood in which he sought, with so much trouble and expense, to establish it, is worth noting in connection with this attempt at introduction. It shows how oblivious of the lower forms of animal life even those much interested in them may be.

To return to the subject of the Frog in Ireland, Dr. Joyce

⁴ G. A. Boulenger, "Note on the Edible Frog in England," *Proc. Zool. Soc.*, 1884.

⁵ G. A. Boulenger, "On the Origin of the Edible Frog in England," *Zoologist*, 3rd series, vol. viii., 1884.

has very kindly drawn my attention to the historical works of Giraldus Cambrensis, a whole chapter in which is devoted to the story of a Frog, which had then been found in Ireland. Giraldus acted as secretary to Prince John, who was sent on a visit to Ireland by his father, King Henry II. The portion of these works on the "Topography of Ireland" was written in 1187. As this seems to be the first record of an Irish Frog, I hope I may be excused for quoting some of his statements in full from a faithful translation.⁶

"There are neither snakes nor adders, toads nor frogs, tortoises nor scorpions nor dragons in Ireland. It produces however, spiders, leeches and lizards, but they are quite harmless. It does appear very wonderful that, where anything venomous is brought there from other lands, it never could exist in Ireland. I have also heard it said by merchants, that on some occasions, having unloaded their ships in an Irish port, they found toads in the bottom of the hold; having thrown them on shore in a living state, they immediately turned on their backs and bursting their bellies died, to the astonishment of many who witnessed it. Nevertheless, a frog was found, within my time, in the grassy meadows near Waterford and brought to Court alive before Robert Poer, who was at the time Warden there, and many others, both English and Irish. And when numbers of both nations, and particularly the Irish, had beheld it with great astonishment, at last Duvenold, King of Ossory, a man of sense among his people and faithful, who happened to be present, beating his head, and having deep grief at heart, spoke thus:—'That reptile is the bearer of doleful news to Ireland.'

"No man, however, will venture to suppose that this reptile was ever born in Ireland, for the mud there does not, as in other countries, contain the germs from which green Frogs are bred. If that had been the case, they would have been found more frequently, and in greater numbers, both before and after the time mentioned. It may have happened that some particle of the germ, hid in the moist soil, had been exhaled into the clouds by the heat of the atmosphere, and wafted hither by the force of the winds, or perhaps, that the embryo reptile had been swept into the hollow of a descending cloud, and being by chance deposited here, was lodged in an unhospitable and ungenial soil. But the better opinion is that the Frog was brought from some neighbouring port, and being cast on shore, succeeded in subsisting and maintaining life for a time, as it is not a venomous animal."

There seems therefore to be no doubt that a Frog was actually found near Waterford, about the year 1187; and that, in those earlier times, no one thought of introducing frogs into Ireland, may be assumed, as he would have fared very badly on account

⁶ Giraldus Cambrensis, "The Topography of Ireland; its Miracles and Wonders."—Bohn's Antiquarian Library, 1881.

of the general prejudice against them and kindred animals. The history of Giraldus contains frequent allusions to the supposed sacred quality of the soil and air of Ireland, which was believed not only to render the existence of poisonous animals impossible, but even caused all poisons brought here to become innocuous. We may certainly believe the people to have done their utmost to support this belief so agreeable to their pride of country, and which helped to bring pilgrims (the tourists of that time!) to the "Isle of Saints."

Giraldus, in the passage quoted, states that the Frog is not venomous, but the scene described by him, and his remarks elsewhere, tend to the belief that frogs, as well as toads, were generally held to be poisonous by the Irish.

It may indeed be that most people were really ignorant of their existence in the country. I venture to think that many people would deny at the present day that toads live in Ireland, and yet they are plentiful about Dingle Bay. Waterfowl also were then much more plentiful, as the country was more thinly inhabited, and these birds, in pools and marshes which they now do not frequent, would keep down frogs.

Authorities differ as to whether there is an Irish name for the Frog, Dr. Hyde informing me that there is none, and that the word for "frog" used in the Irish translation of the Bible, which was made about the year 1620-50, is "losgan," a Scotch Gaelic word, not in use in any part of Ireland now, while Dr. Joyce says that the word now used is "cnadan" which is not a very ancient one. This might be explained by the supposition that frogs and other of the lower animals, not being hunted or useful for food, were, in ancient times, spoken of collectively under a name uniting them all, such as "worms," just as many people now-a-days speak of snails and kindred invertebrates as "insects." Dr. Frazer kindly pointed out to me that there is a frog sculptured on the Drumcliffe cross in Co. Sligo, which dates from about the 11th century. There is a drawing of this interesting cross in his wonderful collection of sketches, made principally by himself, of Irish antiquities. However, I attach no special importance to this figure in aiding the present enquiry into the origin of the Frog in Ireland, and we must search for something more tangible to prove its presence there in ancient times.

One of the most convincing proofs of an animal's existence

in a country in former times is the finding of its remains in a fossil condition, and the bones of the Frog have been found associated with those of the bear and other extinct animals in the caves of Ballynamindra, in the County Wexford. But of as much importance is a knowledge of its present distribution. For if, as we are told, the Frog was introduced into Ireland from Trinity College Park, Dublin, it ought to be most common in the suburbs of the city and get rarer as we proceed westwards, as all the lower animals spread with extreme slowness, and radiate outwards from the point where they first obtained a footing. However, as it happens, the Frog is much more common on the west than it is on the east coast. In Kerry it flourishes in great numbers up to certainly 2000 feet on the mountains; from the mountainous regions of Donegal, I have seen many specimens collected by Mr. Patterson; and in Connemara I have found it common, though it is absent from the Aran Islands.

There are undoubtedly few places in Ireland whence the Frog would have less chance of spreading than the College Park, lying as it does almost at sea-level, the current and floods of rivers being generally held to be the principal factors in animal distribution. Besides, we know that frogs and their spawn are killed by sea-water—how then did they reach Achil Island, where we are told by Thompson that they exist.

I have now stated as much as I have been able to ascertain about the supposed introduction of the Frog into Ireland, and the reasons for my belief that it is a true native, and I hope that any of the readers of the *Irish Naturalist* who possess further information on the subject may be induced to send it to the Editors for publication.

THE EARTHWORMS OF IRELAND.

BY REV. HILDERIC FRIEND F.L.S.

THROUGH the courtesy of Dr. Scharff of Dublin, and other naturalists resident in Ireland, I have been able during the past few months to make some notes on this hitherto greatly neglected branch of natural history, and as the subject is new, and any information respecting the classification, identification, and distribution of Irish earthworms will prove of service to

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future investigators, I venture to lay before the reader an account of those species which have thus far been identified.

The indigenous earthworms of Great Britain are, as far as at present known, without exception, members of one family—the *Lumbricidæ*. This family is composed of some half a dozen genera, four at least of which are represented in our fauna. These genera bear the following names, *Lumbricus*, *Allolobophora*, *Dendrobæna*, and *Allurus*. One or two others, (as *Crodrilus*, and *Tetragonurus*) are at the present time either unknown within our borders, or their affinities are doubtful. Further research will alone enable us to decide some points which sadly need elucidation, and our readers will render good service to science by doing all in their power to aid in the solution of these difficulties. Meanwhile I shall be content to treat only of such genera and species as I have been able personally to examine and determine. As indicative of the present state of knowledge on this subject it may be remarked that my paper communicated to the British Association last year, contained an account of a score of indigenous species, whereas ten years ago it was assumed that we had only eight or nine native worms in Great Britain. Since that paper was written the number has been raised to twenty-four or twenty-five. There are five species of *Lumbricus*, and as many of *Allurus*, while all the rest belong to the two remaining genera, whose boundaries have yet to be accurately defined.

In this first part of my paper I confine my attention to the oldest genus, and describe only those species of *Lumbricus* which are known to-day as Irish. These are five in number, but there is every reason to believe that one other species might be found in the Island. We may take them in the order in which they were made known to the public.

***Lumbricus terrestris*, Linn.**—COMMON EARTHWORM. At last, after the lapse of nearly a century and a half, since Linnæus first named this animal, we are able to give an accurate account of the same. Confusion has been worse confounded again and again by the mixing up of half a dozen different species under the old name, and even so recently as the last decade systematists had not discovered the difference between the long worm (*Allolobophora longa*, Ude), and the earthworm, though they belonged to separate genera. To distinguish these two genera attention must be paid to the formation of the head, and the method by which the front lobe is inserted into the first ring. If the first ring is cut entirely in two by the backward prolongation of the front lobe or prostomium, when viewed from above (fig. 1) we conclude that the worm is a species of *Lumbricus*; if it is only partially cut (fig 2) we are examining a representative of the genus *Allolobophora*. There are exceptions which will be noted later. The earthworm is usually

about five inches long, of a dark brown colour, iridescent, with a flattened tail and cylindrical body. When adult the girdle is prominent, and always extends from the 30th to the 37th segment. Under four girdle segments we find a band (fig. 3) on either side, and on segment 15 a pair of swollen protuberances, or papillæ, carrying the male pores. The setæ are in four couples, the individuals of which are nearly close together (fig. 4).

DISTRIBUTION IN IRELAND. *Lumbricus terrestris* has reached me from Valentia Island, Kerry (Miss M. J. Delap); Newcastle, Co. Down (Mr. Praeger); Clondalkin and Leeson-park, Dublin (Dr. Scharff); Letterkenny, Co. Donegal (Mr. H. C. Hart); Malahide, Co. Dublin (Mr. J. Trumbull), and Loughbrickland, Co. Down (Rev. H. W. Lett).

***Lumbricus rubellus*, Hoffmeister—RED WORM.** This worm has been known for about half a century, and its distribution is very wide. It is usually about three inches in length, and has all the characters of the typical *Lumbricus*. It can be readily distinguished from the foregoing, however, by the utter absence of papillæ on the 15th and other segments, and by the position of the girdle, which occupies segments 27 to 32. As usual in this genus, a band known as the puberty band (or *tubercula pubertatis*) runs along the four innermost segments of the girdle. The worm is very active, and abounds in most parts of the British Isles, in all kinds of soil and every conceivable locality.

DISTRIBUTION IN IRELAND. *Lumbricus rubellus* has been sent from half-a-dozen localities. Mr. Praeger has supplied it from Newcastle, and Dr. Scharff from Leeson-park, Dublin; in the latter case they were all immature. It has also reached me from Letterkenny (Mr. Hart); Malahide (Mr. J. Trumbull); Glasnevin (Mr. J. R. Redding); Loughbrickland (Rev. H. W. Lett), and Powerscourt, Co. Wicklow (Dr. Scharff).

***Lumbricus purpureus*, Eisen—PURPLE WORM.** This is the smallest of the worms in this genus. It averages about two inches in length, and is readily identified as a genuine *Lumbricus* by its colour, iridescence, 'mortise and tenon' shaped head, close setæ, and girdle of six segments extending from the 28th to the 33rd. It is exceedingly active, and can run backwards almost as rapidly as forwards. Savigny undoubtedly knew the species long before Eisen described it, for he gives its characters very accurately—so far as they were observed in those early times—in connection with a species which he named *Enterion castaneum*.

DISTRIBUTION IN IRELAND. *Lumbricus purpureus* is widely distributed. I have specimens from Valentia Island, Kerry, sent by Miss Delap; Newcastle (Mr. Praeger); Leeson-park and Clondalkin, Dublin, and Powerscourt (Dr. Scharff); Malahide (Mr. Trumbull), and Letterkenny (Mr. Hart).

***Lumbricus rubescens*, Friend—RUDDY WORM.** This interesting worm has recently been sent me from Ireland. It comes midway between the common earthworm and the red worm, is from three to four inches in length, and has the girdle on segments 34 to 39, with the band on the four innermost segments. Like the common earthworm it has papillæ on the under surface of the 15th segment, upon which the male pores are placed. In colour and shape it exactly corresponds with the other species of the genus. It was first described by me in 1891 from specimens found in Yorkshire, and has since been discovered in many parts of the United Kingdom, though no continental investigator seems to have found it hitherto. It may have been known to Dugès, and early writers of this century, but the old diagnosis is too meagre to satisfy the demands of modern science.

DISTRIBUTION IN IRELAND. Five beautiful specimens of *Lumbricus rubescens* reached me in good form during the month of October from J. R. Redding, Esq., Glasnevin. One specimen at least carried on its

under surface those remarkable sacs known as spermatophores. I have thus far failed to find these appendages on any other species of *Lumbricus*. Dr. Scharff has also found this worm at Powerscourt. In Yorkshire I have discovered this species hybridizing with the red worm.

Lumbricus papillosus, Friend—PAPILLOSE WORM.—This species is new to science, and is at present known to occur only in Ireland, where it is limited to the County of Dublin. Further study will no doubt reveal its existence elsewhere. A full description has been sent to the Royal Irish Academy, with drawings to illustrate its specific peculiarities. The type will be placed in the Dublin Museum of Science and Art, as one of the series of British Earthworms which I am supplying to that institution. The girdle occupies only five segments (33-37) on two of which (the 34th and 36th) we find a pair of remarkable papillæ. Hence the specific name which I have suggested. On the Continent we similarly find another species of *Lumbricus* which has only five girdle segments (*L. melibæus*, Rosa), but their situation differs from that of *L. papillosus*. Our new species closely resembles the Common Earthworm and the Ruddy Worm, being four inches long, and possessed of papillæ on the fifteenth segment. There is also a peculiar ridge connecting the girdle with the male pores.

DISTRIBUTION IN IRELAND.—*Lumbricus papillosus* first reached me on 16th June, 1892, in a consignment of worms from Dublin, collected by Dr. Scharff in his garden at Leeson Park. I was uncertain about its specific relationships till November, when I again obtained it, from Glasnevin, where it was found by Mr. Redding on a bare pathway in Botanic-road.

It may be helpful if I add a table setting forth the main external features of these species.

Lumbricus.	Segments Occupied by :				Average.	
	Girdle.	Band.	1st Dorsal Pore.	Papillæ.	Length, inches.	No. of Segments.
terrestris , Linn. ..	32-37	33-36	$\frac{8}{9}$	15, 26	5	150-200
papillosus , Fr. ..	33-37	34-37	$\frac{9}{10}$	15, 34, 36	4	—
rubescens , Fr. ..	34-39	35-38	$\frac{8}{9}$	15, 28	4	120-150
rubellus , Hoffm. ..	27-32	28-31	$\frac{7}{8}$	0	3	110-140
purpureus , Eis. ..	28-33	29-32	$\frac{6}{7}$	10	2	90-120

For the encouragement of collectors I may add that I have received from Dr. Scharff at least one species of worm (*Allobophora hibernica*, Friend) which has not been recorded for any other of the British Isles (an account of which is published in the *Proceedings of the Royal Irish Academy*); while another new species (*Allurus macrurus*, Friend) has come from Mr. Trumbull, L.R.C.S., of Malahide. I have in ad-

dition a further specimen which is new to Britain, but the relationships and position of which cannot be determined till a maturer specimen has been examined.

After what we have learned of late respecting the distribution of plants and animals, and the Continental affinities of various Hibernian forms, we may not unnaturally look for some further interesting illustrations from the Emerald Isle. I shall esteem it a favour if correspondents will furnish me with supplies from all parts of the country packed in soft moss. They should be sent alive in tin boxes, the moss being intended to keep them in health. My address is Idle, Bradford, Yorkshire. I may add that it is best to send such packages by Parcels' Post, marked "NATURAL HISTORY SPECIMENS ONLY," as the authorities seem to eye them carefully, and more than one valuable consignment has been lost *en route*.



Fig. 1.



Fig. 2.

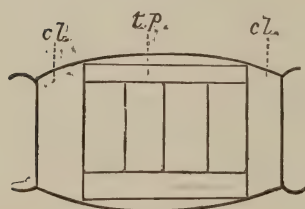


Fig. 3.

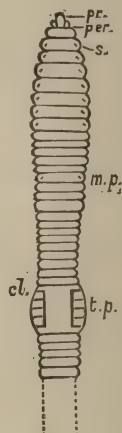


Fig. 4.

Fig. 1. Diagram of head of *Lumbricus*.

pr. prostomium, or lip.

per. peristomium, or first segment, without setae.

s. setae.

Fig. 2. Diagram of head of *Allolobophora*.

Fig. 3. Girdle or clitellum of *Lumbricus*.

cl. clitellum extending over six segments.

t. p. *tubercula pubertalis* in the form of a band over four innermost segments.

Fig. 4. Diagram of *L. rubellus*, Hoff.

m. p. male pores. Other letters as in fig. 1, 3.

(TO BE CONTINUED.)

THE FLORA OF COUNTY ARMAGH.

BY R. LLOYD PRAEGER, B.E., M.R.I.A.

DISTRICT 10 of "Cybele Hibernica," including as it does the counties of Tyrone, Fermanagh, Armagh, Monaghan, and Cavan, may be termed the north-central botanical district of Ireland. The north-eastern maritime district of Down, Antrim, and Derry (No. 12) lies between it and the North Channel, and the north-western maritime district of Donegal (No. 11) cuts it off from the Atlantic; district 10, the largest of the twelve Irish botanical regions, having a surface of over 3,700 square miles, is entirely an inland area, touching estuarine waters only for a few miles at Newry in the south-eastern extremity, and near Strabane in the north-west. This large tract presents a considerable diversity of character, both geological and physical; extensive bogs and lakes are somewhat numerous, and yield a fairly representative flora; several mountain ridges rise to over 2,000 feet, but they are remarkably poor in alpine and montane species; the poverty of the maritime and mountain floras will probably keep the total flora of district 10 below that of districts 11 or 12, even when it has been thoroughly worked out.

The tenth botanical district has not claimed by any means a great amount of attention from Irish botanists, and a glance at "Cybele Hibernica" shows a very large number of blanks in the "district 10" column of the table of distribution, many of even the most widely-spread species being unrecorded. Since the publication of "Cybele," however, Messrs. S. A. Stewart,¹ R. M. Barrington,² H. C. Hart,³ and others, have wiped out many of these blanks, and have added a number of interesting plants to the flora of the district. Their observations having been made chiefly in the western portions of the region under consideration, it appeared to me that further examination of the eastern part might be desirable, not the less so since a number of old records of rare plants existed, the confirmation of which would alone be of some importance

¹ Report on the Botany of the mountainous portion of Fermanagh and Cavan.—*Proc. R. I. A.*, 1882.

² Report on the Flora on the shores of Lough Erne.—*Proc. R. I. A.*, 1883.

³ Notes on the Plants of some of the mountain ranges of Ireland.—*Proc. R. I. A.*, 1883. Rare Plants from Co. Tyrone, *Four. of Bot.*, 1887.

With this end in view, I found time during the past season to spend some three weeks botanising in Co. Armagh, the most easterly county of district 10, and the results of my investigation I now lay before the readers of *The Irish Naturalist*.

The County of Armagh has an area of 512 square miles. Its surface presents a considerable variety of petrological characters, which influence the flora to a greater or less degree, as I shall endeavour to show. The whole northern boundary of the county is formed by Lough Neagh, in itself an interesting botanical region. Stretching along its margin is a broad belt of low, flattish land, characterised by extensive peat bogs which overlies lacustrine clays supposed to be of Pliocene age. In the north-east, a tongue of the basalts of Antrim penetrates into the county as far as Richhill, where it is met by a corresponding tongue of Carboniferous Limestone, the north-eastern extremity of the great limestone area of the Central Plain. North of the city of Armagh, a triangular patch of New Red Sandstone intervenes between the Pliocene and the Carboniferous. South of the basalt and limestone, the Lower Silurians cover the whole centre and south-west of the county, as they do a great portion of the adjoining counties of Down, Monaghan, and Cavan. In the south-east, a mass of ancient granites and basalts, the continuation of the Carlingford mountains, extends and rises in a series of rugged isolated hills, culminating in Slieve Gullion (1,893 feet). These are the only important highlands in the county, the rest of the surface being low, undulating, and (with the exception of the northern bogs) well-tilled; north of Newtownhamilton the Silurians rise in broad ridges to a height of 1,200 feet, but are cultivated almost to their summit. To the south of Keady, and also north-west of Crossmaglen, groups of lakelets occupy deep hollows in the Silurian rocks; other small lakes are scattered through the county, so that with the addition of Lough Gullion and Lough Neagh on the north, the waters of the Blackwater on the west, and the Bann and Newry canal on the east, the conditions for aquatic plant life are favourable. In the extreme south-east the estuary of the Newry river affords for a few miles a habitat for the characteristic flora of the salt-marsh.

Probably the earliest records of Armagh plants are those in Sir Charles Coote's "Statistical Survey of the County of

Armagh" (Dublin, 1804), in which a few of the more striking species are quoted, not always with accuracy. Dr. Mackay's "Flora Hibernica" (1836) supplies some better authenticated notes, which are, however, very few in number. In the "Irish Flora" (1846) Co. Armagh is almost entirely overlooked. The first contribution of importance to the flora of the county is contained in Mr. More's paper "Localities for some Plants observed in Ireland," read before the Dublin University Zoological and Botanical Association, in May, 1860, and published in the *Natural History Review* for that year. The first part of this paper enumerates the rarer plants "noticed in the County of Armagh during April and May, 1854," and is the result of observations made by the author during a stay at Loughgall, in the northern portion of the county; a number of the characteristic plants of Lough Neagh and the northern bog district are here recorded for the first time. Dr. Dickie's "Flora of Ulster" (1864) gives some interesting notes of Mr. John Templeton's, dating about the beginning of the century, and also some good finds made in the county by Rev. George Robinson, and by Messrs. G. C. Hyndman, William Thompson, and the author himself. More's notes are here republished, but with the addition of an unfortunate mistake. Mr. More, writing from Loughgall during his visit there, sent to Dr. Dickie a "London Catalogue" with all the plants observed by him in Co. Armagh checked off. The author of "Flora of Ulster" assumed that the plants named had all been found at Loughgall, and published as growing there, for instance, such rarities as *Calamagrostis stricta* and *Lathyrus palustris*, which Mr. More had seen on an islet in Lough Neagh, and as subsequently transpired, not in Armagh at all, but in the adjoining county of Tyrone. In "Cybele Hibernica" (1866) these errors are for the most part rectified, and the proper stations given; some further records by Rev. Mr. Robinson appear, and some valuable notes by Dr. D. Moore. One or two additional notes are gleaned from Mr. More's "Recent Additions to the Flora of Ireland," published in the *Journal of Botany* for 1873. Stewart and Corry's "Flora of the North-east of Ireland" (1888) though dealing with an adjoining district, contains references to one or two rare Armagh plants. From the *Proceedings of the Belfast Naturalists' Field Club*, 1863-92, are gathered a number of

records of plants obtained by members in the county during the excursions of that society; an appendix to the *Report* of 1885-6, "The Ferns of Ulster" by Mr. W. H. Phillips and the writer supplies a number of stations for the rarer Filices. So far as I am aware, this completes the enumeration of the published records of Armagh plants.

Of unpublished material, a considerable amount has been forthcoming, and I am deeply indebted to several good friends for their hearty co-operation and willing assistance. Mr. A. G. More and Mr. S. A. Stewart have, with their usual kindness, helped me considerably with notes and advice. To Rev. H. W. Lett, M.A., and Rev. W. F. Johnson, M.A., my best thanks are due for kindly placing at my disposal their herbaria of Armagh plants. The former collection was made principally about Ardmore Point, on Lough Neagh, between 1865 to 1885, the latter in the neighbourhood of Armagh during 1880; from both collections a large number of valuable records were obtained. Mr. Lett also assisted me by forwarding a bundle of fresh *Rubi*, collected in the parish of Ballymore or Tanderagee, and Mr. Johnson by sending up several gatherings of *Carices*. Rev. Geo. Robinson kindly supplied me with some additional notes; the herbarium of the Belfast Natural History and Philosophical Society yielded one or two Armagh stations, and my own note-book from 1881 to 1892 added a few notes of plants observed in various parts of the county during that period. To the above material, which would in itself have formed a very respectable local list, I have been able to add largely by my recent observations.

The flora of Co. Armagh, leaving out of account such plants as have no claim to be considered native, and those which, though recorded from the county, do not appear to now exist in their former habitats, numbers 615 species and 20 varieties. The total species enumerated in the present paper is 665, made up as follows:—indigenous plants, 593; possibly introduced, 12; probably introduced, 10; certainly introduced, 40; recorded from the county, but not now to be found, 10; total, 665. There is a poverty of maritime and of mountain plants. The former is to be expected. As regards the latter, although Slieve Gullion overtops any of the Antrim hills, the hard and sterile nature of the primary basalt of which it is composed, so different from the rich friable basalts of Antrim, and the

absence of projecting rocks and cliffs, sufficiently account for their absence. I did not find a single Hawkweed (excepting, of course, the ubiquitous *H. pilosella*) on the Armagh mountains, while at least fifteen different forms flourish on the adjoining granite hills of Down. Comparing the Armagh flora with that of the counties comprising district 12, we find that the flora of Down numbers about 710 species, Antrim, 750, Derry, 670. The flora of Donegal, I am informed by Mr. H. C. Hart, comprises about 720 species. All these counties possess a fair share of mountain plants, and have a wide extent of both rocky and sandy seashore, inhabited by many species which affect such situations. The area of each of the north-eastern counties is from one and a-half times to twice the area of Armagh, and Donegal is nearly four times as large, so that when the small size of the county is taken into consideration, the flora of Armagh is decidedly a rich one. The adjoining western counties cannot enter into this comparison, their floras being so little known, except perhaps, Fermanagh, to which the combined lists of Stewart,¹ Barrington,² and the writer³ assign a flora of some 450 species; here mountain plants are rare, and maritime species absent.

Of Mr. Watson's Atlantic type, Co. Armagh possesses only five out of forty-one Irish species—*Sedum anglicum*, *Cotyledon umbilicus*, *Pinguicula lusitanica*, *Lastrea æmula*, *Hymenophyllum tunbridgense*. Out of eighteen Irish Germanic plants, one only, *Orchis pyramidalis*, grows in the county. Equally poor is the alpine flora, only four of the forty-seven Irish plants of Highland type occurring—*Galium boreale*, *Vaccinium vitis-idaea*, *Selaginella spinosa*, and *Isoetes lacustris*, and none of these are confined to alpine situations in the county, *Galium* growing on the shores of Lough Neagh (50 feet elevation), *Vaccinium* being recorded from the northern bogs (under 100 feet), *Isoetes* ranging from 286 to 444 feet, and *Selaginella* growing from 700 feet upwards.

(TO BE CONTINUED.)

Another Irish Field Club. "The cry is still they come." Limerick has followed the excellent example of Cork, and we congratulate our friends most heartily on the successful formation of a Naturalists' Field Club in that city. Limerick is the centre of a highly interesting district, which can still bear with advantage much careful investigation, and we have no doubt that the new Club will soon make its influence felt in Irish scientific circles.

¹ *Op. cit.*

² *Op. cit.*

³ *Irish Naturalist*, 1892, p. 113.

DENUDATION AT CULTRA, CO. DOWN.

BY MARY K. ANDREWS.

(Read before the Belfast Naturalists' Field Club, December 20th, 1892).

TRADITION, history, and geological evidence all bear testimony to the continued interchange, within certain limits, of land and water. Although the deep depressions of the ocean and the main trends of the land seem, from the very earliest geological periods, to have preserved their same general positions on the globe,¹ yet a careful comparison of the upheaved stratified formations, with the layers of gravel, shells, sand, and mud deposited in the comparatively shallow seas around our coasts, leaves little doubt that very large portions of our land areas, were, at one period or another, laid down upon the floor of the sea. Subject to the action of internal forces they have experienced many oscillations of level, insular conditions at one period predominating, continental at another; crustal movements, modified by denudation and deposition, governing the relative levels of land and sea.

It was a fundamental proposition of the Huttonian Theory, "That in all the strata we discover proofs of the materials having existed as elements of bodies, which must have been destroyed before the formation of those of which these materials now actually make a part."² One portion of the earth's surface is slowly and constantly wasted, denuded, and transported to the sea, whilst another portion, formed from similar materials of pre-existing land, is as constantly consolidated and raised to take its place. In this sequence of events, protracted through an indefinite period of time, Hutton recognized one general constant order in nature, the ruins of an older world always forming the foundations of a newer. In the decay of

¹ "Geographers must, for the present, be content to take the world as they find it. What we do know is that our lands are distributed over the surface of a great continental plateau of irregular form, the bounding slopes of which plunge down more or less steeply into a vast oceanic depression. So far as geological research has gone, there is reason to believe that these elevated and depressed areas are of primeval antiquity—that they antedate the very oldest of the sedimentary formations."—*Address to the Geographical Section of the British Association*, 1892, by Professor James Geikie, LL.D., etc.

² Playfair's "Illustrations of the Huttonian Theory," p. 23.

the solid rocks, and the transportation of their material, he also saw the source of our beautiful systems of mountains and valleys, of hills and fertile plains. He thus opened up the border land between geology and physical geography, and gave an impetus to the fascinating study of those epigene or surface agents, which in the present, as in the past, are altering and moulding the scenery of our globe. Their work is constant; denudation and erosion are always in progress. Each mountain rill, each wave that beats against our coast, each shower of rain, leaves a mark upon the surface of the earth.

The effects may be too faint for our observation, or for the observation of generations, but the geologist sees the accumulated results in the deep fissures of the mountain, in the indented shore with sea-worn cave and isolated stack, in the pinnacles and hillocks that lend such varied form and beauty to the undercliff. And further still, along great lines of coast, far above the highest tide-level, caves, escarpments, and successive gravel-capped terraces bear testimony not only to the erosion of former periods, but also to vast movements of elevation, interrupted by long periods of rest, probably also by periods of temporary subsidence.

From the raised beaches of our own coasts to the great terraces of Patagonia, rising like mighty steps one behind the other, we see the effects of the same co-operating actions—erosion, deposition and upheaval. So also in the present, we know that some regions of the earth are relatively rising, others are gradually sinking; the sea is making encroachments on certain coasts, it is receding on others. As a general rule, where the rocks are hard, erosion is slow, where they are soft and more easily disintegrated, it is rapid.

Striking illustrations of marine erosion might be drawn from the tunnelled caves and imposing sea-stacks of our Irish coast, but the encroachment of the sea at Cultra Bay, on the southern side of Belfast Lough, to which I wish to draw attention in the present paper, has left no such impressive features.

Much land has been washed away, of which no trace would have remained, had it not been for one insignificant land-mark, and before it too disappears, I have made a few notes of the encroachment of the sea to which it testifies, which I hope may not be devoid of interest.

The landmark to which I refer is a shaft of crown Memel pine,

about twenty-three feet high, standing on the beach opposite Cultra Point, a mile north-east of Holywood. It formed part of a windmill pump, which was erected, I am informed by Mr. John Lennox, in 1824 or 1825, to remove the water from an old quarry. The upright standard above the much decayed suction-pipe of the pump still remains, with a loose iron rod attached to a small handle at the top. Although fifty feet distant from present high water-mark, and surrounded by the sea to a depth of three feet at high tide, this old pump (Plate 1) marks the centre of a sandstone quarry, opened in what was formerly known as the Point Field.

An inhabitant of Holywood, Mr. William Nimick, who remembers the locality since 1829, informs me that the sea was at that time fifty feet distant from the centre of the quarry, and that the fields, through which a broad carriage drive passed to Cultra Quay, and in which he saw numerous tents pitched, and large crowds of spectators assembled, to watch one of the celebrated regattas¹ of the Northern Yacht Club, have now completely disappeared. He estimates that about five acres of land have since been washed away between Cultra Point and Cultra Pier.²

Disintegrated, by the action of rain, frost, and other sub-aerial agents, portion after portion of the low cliffs have slipped down, an easy prey to the warfare of wave and current; the destruction of the land being still further aided by the removal of sand and gravel from the beach below. And now, at ebb tide, instead of the vanished fields, we see low denuded reefs that carry us back through vistas of time immeasurably vast.

Here in this one small bay we find represented each great division of the geological record. Shales that carry us back to the Palæozoic era, and recall the gradual submergence of the Devonian continent, beneath the waters of the Carboniferous ocean; sandstones that bring us to the Mesozoic era, and restore for us the vast Triassic lakes; dykes that link us with the great basaltic sheets of Tertiary time, and covering the low surrounding cliffs, drift deposits that bring us to Post-Tertiary periods and gradually forward to the time we are considering.

(TO BE CONCLUDED.)

¹The Belfast Regatta of 1829 lasted for nine days—See “The Belfast Newsletter,” June 19th, 1829, and following Nos.

²The extremities of Cultra Bay, scarcely a quarter of a mile distant from each other.

THE
MACRO-LEPIDOPTERA OF THE LONDONDERRY
DISTRICT.

BY D. C. CAMPBELL.

THE district surrounding the old historic city of Derry is most interesting to the student of nature. Of course every district, be it never so barren and seemingly unfruitful to the casual observer, is full of interest to the naturalist. I think, however, we can claim a special interest for Derry, lying as it does with Lough Foyle and Lough Swilly almost at its doors, and having all the varied beauties of river and wave-washed shore, and of woodland, mountain, and moorland, within reach. Such a land, of course, provides a wide field for the entomologist.

The localities I include in the district are almost all within some ten to fifteen miles of Derry city. One or two favourite spots such as Magilligan, at the mouth of Lough Foyle, and Ballycastle, on the Antrim coast, are farther removed.

The entomological work, of which the following list shows the results, was done by my brothers, Messrs. W. Howard Campbell, M.A., and Thomas V. Campbell, M.B. (both now of Cuddupah, Madras), and myself. We were ably assisted by our friend, Mr. James N. Milne, of Culmore. Our collecting days extended from 1875 to 1884, and during these years we explored and hunted almost every accessible locality in our neighbourhood. The list may not be very large, yet it contains many species of some rarity, and some of extreme interest, as new to Ireland. In 1878 we captured *Heliothis scutosa*, a moth so rare in the British Isles, that Newman omitted it altogether in his work on British moths. This specimen was, of course, the prize of our collection. We also took the very interesting species *Nyssia zonaria* on the Antrim coast. The fact that the female is wingless, and that the species had previously only been taken on the coast of Cheshire, adds additional interest to the discovery. I am confident that a careful entomological investigation of Donegal would bring to light many rare, and as far as Ireland is concerned, new species. I have to acknowledge our indebtedness to the late Mr. Birchall for his kindness in identifying speci-

mens for us, also to Mr. W. F. de V. Kane. The advice we received from him from time to time greatly helped us; the interest he took in our captures, and his unfailing kindness in identifying specimens stimulated our ardour for further investigation.

RHOPALOCERA.

The butterflies we found form a small company. The number of species is only about half of that in Mr. Birchall's list of 1868. Many of the absent species *should* occur here, and probably on further investigation will be found. The beautifully-situated, warm, sheltered woodland about Rathmullan, on the Lough Swilly shore, must harbour many butterflies, and should yield some interesting kinds.

Pieris brassicæ, Linn. }

P. rapæ, Linn. }

P. napi, Linn. }

All very common.

Euchloe cardamines, Linn.—Fairly common.

Colias edusa, Fab.—This beautiful butterfly appeared here in some numbers in 1876. We had never seen the species before, and I have never noticed it in this district since; I find the dates of capture in our note-book, 27th June, 15th July, and 9th September, 1876.

Argynnis paphia, Linn.—Not very common, but to be met with in almost all wooded localities. In 1879, I noticed it in some profusion in the glades of the beautiful woods of Ards, near Dunfanaghy.

A. aglaia, Linn.—Common on the coast.

Vanessa urticæ, Linn.—Common everywhere.

V. io, Linn.—We never found this richly-marked species, but Mr. Wm. Hart took it in Innishowen, and Mr. John Cowie reports its occurrence near Derry many years ago.

V. atalanta, Linn.—Not abundant, but in every district.

V. cardui, Linn.—We took a few specimens only of this pretty, cosmopolitan insect every season. In 1880 and 1884, however, it was *very* abundant.

Pararge egeria, Linn. }

P. megæra, Linn. }

Very common.

Satyrus semele, Linn.—Common on the coast. Mr. Milne reports having seen this butterfly *swarming* at Castlerock, between 4 and 5 a.m., on an August morning, although throughout the day only a small number, comparatively speaking, were seen.

Epinephile janira, Linn.—Very common.

E. hyperanthes, Linn.—Rare and local in this district. We found it abundant at Ballymoney, Co. Antrim.

Cœnonympha pamphilus, Linn.—Common.

C. typhon, Rott.—I met this species for the first time, on 22nd July, 1892, on the moors between Gartan and Glenveagh, Co. Donegal, and again at L. Salt, on 23rd July. The specimen I secured is similar to the English variety of the insect (*rothliebii*).

Polyommatus phlæas, Linn.—Common.

Lycæna icarus, Rott.—Found everywhere, but especially abundant upon the coast.

SPHINGES.

Acherontia atropos, Linn.—Several specimens of the “Death’s Head” have been found here, but we have never been so fortunate as to take one. Mr. Milne secured a fine one at Ballycastle, Co. Antrim.

Smerinthus populi, Linn.—Very abundant. We have met with some very beautiful varieties.

Macroglossa stellatarum, Linn.—Occurs in most localities, more abundant on the coast. We took the larvæ, feeding on *Galium*, on Magilligan sandhills.

Zygæna filipendulæ, Linn.—Very common on the shores of Lough Swilly. We took a strange variety, having six spots on one wing, and only five on the other.

We never saw any *Sesiidæ* in the Londonderry district.

BOMBYCES.

Nola confusalis, Herr-Schäff.—One specimen.

Nudaria mundana, Linn.—Common.

Euchelia jacobææ, Linn.—Common.

Nemeophila plantaginis, Linn.—Generally distributed, but not common.

Arctia cala, Linn.—Common.

Spilosoma fuliginosa, Linn.—Common. We found the larvæ swarming on the Magilligan sandhills.

S. lubricipeda, Esp. } Very common.
S. menthastræ, Esp. }

Hepialus hectus, Linn.—Common in the wooded localities.

H. velleda, Hüb.—Common, but seemed to be abundant only in alternate years, during some seasons, hardly a specimen appeared.

H. humuli, Linn.—Very common.

Orgyia antiqua, Linn.—Fairly common.

Eriogaster lanestris, Linn.—Larvæ very abundant on the stunted blackthorn on Magilligan sandhills. We found much difficulty in rearing the larvæ, and only succeeded in bringing out a few imagines. Probably they missed the fresh sea-air of their original home. I believe *E. lanestris* sometimes remains as long as six or seven years in the pupal state, although three years was the longest period with us.

Pæcilocampa populi, Linn.—Two specimens. Mr. Milne has taken the larvæ.

Bombyx rubi, Linn.—Common

B. quercus, var. **callunæ**, Palmer.—Common. We found the larvæ in thousands on the Innishowen moorlands. Unfortunately a large proportion of them were attacked by ichneumons.

Odonestis potatoria, Linn.—Common.

Saturnia pavonia, Linn.—Common.

Drepana lacertinaria, Linn.—Pretty common at Buncrana. We found the larvæ in some numbers in the young birch woods.

Dicranura vinula, Linn.—Common.

D. bifida, Hüb.—One specimen.

D. furcula, Linn.—Rare.

Phalera bucephala, Linn.—Very common.

Pygæra pligra, Hufn.—Common on the shores of Lough Swilly. We took the larvæ plentifully on dwarf sallow at Rathmullan.

Lophopteryx camelina, Linn.—Common.

L. dictæa, Linn.—Common.

L. dictæoides, Esp.—We took two larvæ on birch at Rathmullan.

L. ziczac, Linn.—Common.

L. dromedarius, Linn.—Common.

Thyatira derasa, Linn.—Common.

T. batis, Linn.—Common.

Cymatophora or, Fab.—We took a few larvæ on birch on Lough Swilly shore.

We never found any of the *Lithosiidæ* near Londonderry. It seems strange that they did not turn up at Magilligan, as lichens grow very abundantly upon the dwarf blackthorns on the sandhills.

(TO BE CONTINUED.)

NOTES.

BOTANY.

MUSCI.

Mosses and Hepatics of the Ben Bulbin District. Since I sent the note of Ben Bulbin Mosses (*Irish Naturalist*, vol. i., p. 194), I came upon a packet which had been overlooked, containing the following species, which I would like to add to the other list:—

At Bundoran, *Hypnum lutescens*, Hudson, with old fruit, and *H. intermedium*, Lindb.; in ravine on Seafin Mountain, *Orthothecium intricatum*, Hartn., growing with *O. rufescens*; in Slish Wood, *H. borrieri*, Spruce, *Georgia pellucida*, L., and *Lepidozia reptans*, L.—C. H. WADDELL, Saintfield, Co. Down.

Sphagnum austini (Sull.) in Ireland. While collecting mosses in 1889, on a mountain about two miles south of Glenariff, in the County Antrim, I found a large tussock of *Sphagnum austini*, Sull. I am not aware that it had previously been collected in Ireland, and in September, 1892, while moss-hunting on a part of the Bog of Allen, in the parish of Geashill, King's County, in company with the Rev. Canon C. D. Russell, I discovered a very large clump of this same rare moss. In this last case the whole of the bog for hundreds of yards round had, some months previously, been burned over, and every scrap of heather, bog plants, and moss, cleared off by fire, except this big colony of *Sphagnum austini*, showing how much water it must have contained when the surface of the bog had been blazing. And since then Canon Russell has sent me another specimen of the same moss, which he found in another bog not far from Geashill railway station.—H. W. LETT, Aghaderg, Co. Down.

FERNS.

Polypodium calcareum, at Carlingford, not indigenous. The editorial note in the December number of the *Irish Naturalist* (vol. i. p. 195), on Professor Hart's note concerning *Vanessa io* at Howth, reminds me of my own transgressions. In 1878, my brother and I planted a quantity of *Polypodium calcareum* on Carlingford Mountain. I had forgotten all about it, when, in 1889, the Rev. G. Robinson asked me, as I was thinking of

going down to Omeath, if I would look on Carlingford Mountain for *P. calcarum*, as it had been found there by some gentlemen from Rostrevor, and he could not understand its presence there. I was, of course, able to explain the matter, and I write this note to let it be known, through the medium of the *Irish Naturalist*, that *P. calcarum*, if found on Carlingford Mountain, is not indigenous.—W. F. JOHNSON, Armagh.

PHANEROGAMS.

Plants Still Flowering in Mid-November.—On November 13th, Dr. Scharff and I went for a ramble along the Upper Dodder, between Tallaght and Fort Bridge, through the Ballinascorney Gap, and across Mount Seskin to "Embankment." We found quite a surprising number of species still in flower at that very advanced time of year, long after the end of the ordinary flowering-period. The following is the list:—*Ranunculus bulbosus*, *R. flammula*, *Reseda luteola*, *Barbarea vulgaris*, *Nasturtium officinale*, *Capsella bursa-pastoris*, *Sisymbrium officinale*, *Brassica nigra*, *Cardamine hirsuta*, *Polygala vulgaris* (purple flowers), *Arenaria serpyllifolia*, *Cerastium semidecandrum*, *Rubus fruticosus*, *Potentilla reptans*, *Alchemilla vulgaris*, *Ulex europaeus*, *Trifolium procumbens*, *T. minus*, *T. pratense*, *Pimpinella saxifraga*, *Daucus carota*, *Geranium robertianum*, *Sherardia arvensis*, *Carduus lanceolatus*, *C. palustris*, *Matricaria inodora*, *Hieracium* sp., *Achillea millefolium*, *Bellis perennis*, *Senecio jacobæa*, *S. vulgaris*, *Centaurea nigra*, *Erigeron acris* (extremely abundant), *Lapsana communis*, *Sonchus oleraceus*, *Jasione montana*, *Chloroperfoliata*, *Origanum vulgare*, *Lamium album*, *Teucrium scorodonia*, *Veronica chamaedrys*, *V. montana*, *Erica cinerea*, *Anagallis arvensis*, *Myosotis versicolor*. The continuance in flower of such a strikingly large number of species is really a fact of much interest, and a striking commentary on the character of our climate.—E. J. M'WEESEY, Dublin.

Allium scorodoprasum, L. in Co. Cork.—As this is one of the rarest of Irish plants, and hitherto recorded only from Killarney and Foaty ("Cybele Hibernica"), it may be worth noting that in the summer of 1890 I found it plentiful in the woods at Castlefrenke, Rosscarbery, and again this year whilst botanising with the Cork Naturalists' Field Club on 1st August, it formed the "find" of the day, growing in great profusion in the woods near Bantry.—R. A. PHILLIPS, Ashburton, Cork.

Orobanche minor, L. in Co. Cork.—This plant is recorded in "Cybele Hibernica" as an introduced plant in two stations rather close together, i.e., Aghada and Trabolgan. From observations made during the last few years, I am inclined to think that, though it may not be entitled to rank as a native plant, it certainly deserves a place among the established species. It occurs in many widely-separated districts in this county, plentiful in some, and scarce in others. In the district around Clonakilty it seems to be most abundant, occurring not alone in recently-cultivated clover fields, but almost as plentifully in pastures which have not been ploughed for many years. It also occurs in old pastures near Eastferry, Middleton, and at Youghal. Last year it was most luxuriant in a newly-planted field of *Trifolium pratense* near Cork, but although the clover had not been disturbed, the *Orobanche* did not appear this year.—R. A. PHILLIPS.

White Centaury (*Erythræa centaurium*). As noticed in the *Irish Naturalist* (vol. i., p. 168), this is rather an uncommon plant, but numerous specimens may be found on the headland of Currabenny, Cork Harbour, along with that beautiful little plant the Milkwort (*Polygala vulgaris*), which grows here in great abundance in July and August.—A. N. ABBOTT, Cork.

I believe white Centaury is local rather than rare. There is a small mill-stream at Ballyhyland, along the lower part of whose banks all the Centaury is white, while that which grows in the field above is of the usual pink. Not far away are some dry, stony fields, in which both pink

and white Centaury flourish abundantly. The latter ground is also productive of great variation in the colouring of *Prunella vulgaris* (Self-heal), of which, besides specimens of the ordinary purple hue, large quantities of white, marjoram-pink, and faint lavender-tinted blossoms, may be gathered every year.—C. B. MOFFAT, Ballyhyland, Co. Wexford.

White Bugle (*Ajuga reptans*). This summer I counted fourteen plants of *Ajuga reptans*, all bearing white flowers, under one tree, in a wood at Ballyhyland. Within this circumscribed space I saw no spike whose flowers were of the normal colour. The ground, though shaded, was not perceptibly more so than throughout the rest of the wood, where the *Ajuga* is uniformly blue.—C. B. MOFFAT.

ZOOLOGY.

CRUSTACEA.

Crustacea from Upper Lough Erne and Lough Corrib. The following list of species captured by me in Upper Lough Erne, in the years 1886-88 may be of interest. Several of them were identified by Professor G. S. Brady:—The Phyllopods comprised—*Daphnia pulex* common near the shores; *D. galeata*, on two occasions at surface in centre of lake, when the sun was shining; *Sida crystallina*, common in the bays, especially amongst the weeds, often adhering to lower surface of leaves of water-lilies, etc.; *Leptodora hyalina*, common; *Bythotrephes* sp. taken in large numbers at the surface in centre of lake, on a hot afternoon in August, 1886: it was then so plentiful that a tumbler dipped in the lake would bring up three or four specimens. I have since obtained it on other occasions, but never in such profusion; *Bosmina coregoni*. The Copepods were—*Cyclops coronatus*, *Diaptomas castor*, *Tenura velox*, and *Argulus foliaceus*, the last very common, both free-swimming and on perch, etc. *Pontoporeia affinis* represents the Amphipods; two specimens only were found amongst weeds in a sheltered bay; the importance of this form (together with *Gammarus neglectus* and *Mysis oculata*, var. *relicta*) lies in their being looked upon as relics of an old marine fauna. I have heard that *Mysis* occurs in Lough Neagh. If any reader of the *Irish Naturalist* comes across it, I should be extremely obliged for specimens.

From the "Proceedings of the Dublin Microscopic Club," reported in *Quarterly Journal of Microscopic Science*, vol. xii., we learn that Mr. Arthur Andrews found the following species in Lough Corrib:—*Pholyphemus pediculus*, on one occasion whilst fishing in Lough Corrib with a small muslin net, hundreds were taken at a single dip in a sheltered sunny creek, while further search along the same shore failed in procuring a single specimen; *Lynceus elongatus*, *Sida crystallina*, *Daphnia mucronata*, and *Acantholebris curvirostris*, Lilly, (*acanthococcus*, Schöll.), plentiful in most small bog pools. *Lynceus elongatus* and *Bosmina longirostris* are reported from Clonhugh lake, near Mullingar.—R. N. CREIGHTON, Ballyshannon, Co. Donegal.

INSECTS.

Lepidoptera at Armagh.—Last year I picked up a larva of *Loophortyx camolina* on oak, and a fine specimen emerged last May. From Mr. Halbert's note, *Irish Naturalist*, vol. i., p. 195, I see that it has hitherto only been recorded from the south. It may interest him to know that I took *Zanclognatha grisealis* here in 1889, vide *Ent. Monthly Mag.* (2) vol. i. p. 140. In August *Melanthia ocellata* flew into my house, and on September 23rd, I saw a specimen of *Vanessa atalanta* flying up the road. It was remarkable that this butterfly and *V. cardui* should appear here this year, for it has been about as bad a year as possible for Lepidoptera. I took a specimen of *Stigmanota regiana* in June sitting on the wall of the Cathedral. *Peroneæ* were very scarce. I got only one *P. perplexana*, and a couple of *P. variegana*. Besides these, the only captures worth mentioning are *An-*

chocelis pestacina and *Himera pennaria*. Sugar was a total failure, producing nothing but disappointment, and a dissipated specimen of *Xylophasia monoglypha*.—W. F. JOHNSON, Armagh.

FISHES.

Sharks in Irish Waters.—Mr. W. F. de V. Kane contributes to the *Field* of 10th December, 1892, an interesting article on this subject, giving accounts of the capture of the Great Basking-Shark (*Selache maxima*) off the west coast, and discussing the economic value of the fishery.

BIRDS.

The Birds of Lough Swilly.—Having an intimate acquaintance with Co. Donegal generally, and those parts south and west of Lough Swilly more particularly, I was greatly interested in Professor Leebody's paper on the "Birds of Lough Swilly," but must take exception to his statement (*Irish Naturalist*, vol. i., p. 175), as to Wigeon flying to inland waters at dusk, and to sea or saltwater at dawn. They may do so at Inch, but they do exactly the opposite on the western side of the lough, where often in flight-shooting I have brought down Wild Duck, Teal, and Wigeon, at night on their way from Lough Fern to Lough Swilly, and in the morning have frequently seen them return. Within the last few years Cormorants have come in great numbers from Lough Swilly to Lough Fern in the evening. Formerly they did not do so, although there were always a few about the lough, both by day and night. Lough Fern is a sheet of fresh water about one and a-half miles long by one mile broad, some four miles as the crow flies, west of Lough Swilly.—J. H. H. SWINEY, Belfast.

Crossbill (*Loxia curvirostra*) and Grey Phalarope (*Ph. fulicarius*) near Mullingar. It may interest readers of the *Irish Naturalist* to know that I shot these birds in November, the latter on Lough Ennell.—J. TAYLOR, Belvidere, Mullingar.

Nesting of the Great Crested Grebe (*Podiceps cristatus*, L.). To the *Zoologist* for December Rev. Allan Ellison contributes an interesting note on the nesting of this bird at Hillsborough, Co. Down, where several pairs bred last season.

Honey Buzzard (*Pernis apivorus*, L.) in Co. Wexford. Mr. E. Williams records in the *Zoologist* for December a male Honey Buzzard, shot in the middle of October, in a wood near the town of Gorey.

Bee-eater (*Merops apiaster* L.) in Co. Wicklow. A female Bee-eater in first year's plumage was shot by Mr. John Graydon on a bog near Delgany. It was one of a flock of six.—E. WILLIAMS (in the *Zoologist* for December).

Snowy Owl (*Nyctea scandiaca*, Linn.), on Achill Island. In the "Irish Times" of December 14th, Mr. R. Harvey states that he shot a specimen of this rare owl on Achill Island.

MAMMALS.

The supposed Hybrid Hare and Rabbit an English Hare. In the October number of the *Irish Naturalist* (vol. i. p. 147) I described a supposed hybrid between hare and rabbit, which I had received. Mr. Eagle Clarke, of the Edinburgh Museum, has given this specimen careful examination, and finds that it is only *Lepus timidus*—the English Hare, which has been introduced at a few places in Ireland.—ARTHUR J. COLLINS, Belfast.

The Badger (*Meles taxus*), in Ireland. Various correspondents to the *Field*, in November, 1892, agree in stating that this animal is fairly common in Ireland, though it is unfrequently seen on account of its nocturnal habits.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations to the Gardens comprise a Mongoose from Captain Guinness; Pheasants from F. Norman, Esq., and Mr. Hunt; three Guinea Pigs from J. A. Higgins, Esq., and a Peregrine Falcon from W. Corbett, Esq. Two Seals, a Mongoose, a Racoon, a Carval, and a Porcupine have been acquired by purchase.

4,500 persons visited the Gardens in November.

DUBLIN MICROSCOPICAL CLUB.

NOVEMBER 25th.—The Club met at PROF. E. P. WRIGHT'S.

Wrightia (Atractylis) arenosa, Wr., was exhibited by PROF. A. C. HADDON. This is a gymnoblastic hydroid, new to Ireland, recently discovered on the west coast.

Nemastoma bacilliferum, Sim., and *Sabacon paradoxus* Sim., were shown by MR. G. H. CARPENTER. These are two curious phalangids collected in the Pyrenees by Dr. Scharff.

Platyarthrus Hoffmannseggii was shown by DR. R. F. SCHARFF, who procured it at Leixlip, Co. Kildare. This crustacean belongs to the woodlouse family (*Oniscidae*), and is an inhabitant of ants' nests. It had not been previously taken in Ireland, but it has occurred in the south of England, France, and Spain. Besides being perfectly white, it is easily distinguished from the other Irish species of woodlice by its club-shaped and flattened antennæ.

Cordyceps militaris (var. *sphærocephala*) was shown by MR. GREENWOOD PIM. It has been sent by Rev. Canon Russell, who received it from Wales. This interesting variety, according to Dr. Cooke's work on Entomogenous Fungi just published, is only recorded from Saxony. Hence this seems to be the first time it has occurred in Britain. It differs from the normal form in having the capitulum more or less spherical instead of clavate, and the conceptacles containing the filiform, asci and spores project considerably, and, being deep red in colour, make this an exceedingly beautiful object with condensed light.

Bacterium rubescens, Lank., was shown by MR. F. W. MOORE, who had observed it in some *Sphagnum* from the Dublin mountains. Its presence in quantity imparts a highly red colour to the *Sphagnum*, even the cell walls being stained. The minute cells of the *Bacterium* are seen to be arranged in various ways under a high power, presenting very beautiful combinations.

Wildmania amplissimum Kjell., was shown by PROF. T. JOHNSON. This seaweed differs from *Porphyreia* in being two-layered, as *Monstroma* does from *Ulva*. The plant was collected by the late Dr. D. Moore on the coast of Antrim in 1838. A specimen, in the Trinity College Herbarium, collected in the Orkneys by Pollexfen, was exhibited by Dr. E. P. Wright's permission. Attention was called to another specimen in the Herbarium of Science and Art Museum, and collected by Miss A. Ball at Clontarf. The only record of the plant in Ireland hitherto is by Holmes and Watters, who have seen a specimen from the south-east coast of Ireland. Kjellman founded the genus on plants growing in the Arctic sea. The distribution is thus interesting.

Longitudinal Sections of the Stems of Robinia pseudacacia and Wisteria sinensis were shown by MR. H. H. DIXON. These sections showed the peculiar form of the "slime" masses contained in the sieve-tubes. Usually near the middle of the tube there is a spindle or barrel-shaped body which is suspended in that position by a filament running to each end of the tube. The central body and the filament give the same reactions as the so-called "protoplasmic slime" of typical sieve-

tubes. In some sieve-tubes the "slime" mass lies against one of the plates, while the filament running to the other plate is greatly elongated.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

DECEMBER 6th.—The President (PROF. FITZGERALD) in the chair. MR. A. TATE, C.E., submitted his report, as delegate from the Society, to the 1892 Meeting of the British Association. MR. R. LLOYD PRAEGER, M.R.I.A., gave a lecture, entitled "Botanical Rambles in Co. Armagh." A full account of the results of the lecturer's rambles is now appearing in the pages of the *Irish Naturalist*. MR. R. M. YOUNG, M.R.I.A., read a paper, entitled "Antiquarian Notes on Bushfoot and Ballymagarry."

BELFAST NATURALISTS' FIELD CLUB.

NOVEMBER 22nd.—The President (MR. JOHN VINYCOMB), delivered his Opening Address on the subject of "The Origin and Significance of our National Emblems." The Senior Secretary (MR. R. LLOYD PRAEGER) submitted the report of the sub-committee appointed to investigate the glacial gravels of Ballyrudder, near Larne, Co. Antrim. The report gave a detailed account of the interesting bed in question, and lists of the fossils found in the different zones; the following are the conclusions of the sub-committee:—

"The deposits at Ballyrudder consist of a bed of stratified gravels underlying a thick layer of unstratified Boulder Clay. There is no clear line of demarcation between the two beds, the one merging gradually into the other. The fauna of the gravels shows that they were deposited during a period of intensely arctic conditions. The gravels represent a former shore-line, which a subsequent submergence has covered with marine Boulder Clay. The clay, and all the zones of the gravels yield flints derived from the Chalk. These are frequently broken, and flakes and core-like objects are the result. The flakes are usually quite shapeless, and only one was found by the committee bearing a bulb of percussion. None of the flints found bore any character which might lead the sub-committee to suppose that they were formed by human hands."

MR. WM. GRAY, M.R.I.A., then presented his report as a delegate from the Club to the 1892 Meeting of the British Association, dealing particularly with the destruction of native plants and birds' eggs, and the work of the ethnographical and geological photographs committees.

MR. JOSEPH WRIGHT, F.G.S., then made some remarks on rare local foraminifera recently found, of which he exhibited diagrams. He said that on the dredging cruise which the Club had some years ago in the steam-tug "Protector," one of the hauls was taken in deep water, a hundred fathoms, about midway between Belfast and Portpatrick. This material, which has only recently been examined microscopically, has yielded a large number of foraminifera, several of them being rare and interesting species; the most noteworthy are *Technitella legumen*, *Hyperammina arborescens*, *H. elongata*, very large in size, *Webbina clavata*, and *W. hemispherica*. The last of these is a very simple organism, of great rarity, and hitherto only known from three specimens—one fossil from the Sutton Crag, the other two from dredgings taken by Messrs. Norman and Robertson, off the Durham coast. In a dredging recently taken by a member, Mr. Hamilton McCleary, in Strangford Lough, no fewer than eighty-five different species of foraminifera were obtained, two of them, *Anmodiscus shoneanus* and *Discorbina parisiensis*, being very rare forms.

DUBLIN NATURALISTS' FIELD CLUB.

NOVEMBER 15th.—DR. E. J. M'WEENEY, President, in the chair. PROF. A. C. HADDON, M.A., gave an account, illustrated by lantern views, of his visit to the Aran Islands with Dr. C. R. Browne, for the purpose of ethnological research. The physical characters, dress, occupations, and habits of the people of the island were described with much interesting detail. Rev. M. H. Close, Dr. C. R. Browne, Mr. J. Shackleton, and Mr. H. Wigham, took part in the discussion.

MR. T. CHANDLEE exhibited models, made by himself, of a cromlech at Glanworth, Co. Cork, and of a stone cross at Moone Abbey, Co. Kildare.

ARMAGH NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

NOVEMBER 21st.—REV. W. F. JOHNSON, President, in the chair. The President gave his Annual Address on "The History of the Society," in which he traced the course of the Society from its first origin in October, 1839, to the present day.

DECEMBER 5th.—The President in the chair. After the ordinary business had been concluded, the President exhibited a case of British Butterflies. Among these was a North American species, *Danaïs archippus*, which Mr. Johnson informed the meeting was endeavouring to establish itself in the south of England, after spreading from Canada to the Amazons, and across the Pacific Islands to New Zealand, Tasmania, and Norfolk Island.

CORK NATURALISTS' FIELD CLUB.

NOVEMBER 2nd.—The President, PROF. M. M. HARTOG, D.Sc., in the chair. The Secretary gave an account of negotiations carried on with various committees with the object of obtaining for the club space in the Crawford Municipal Buildings in which to form a museum. The matter had not been finally arranged, and further meetings were to take place.

PROF. HARTOG then gave his Inaugural Address, entitled the "Life of a Cell," dealing with the formation and gradual development of the cell in vegetable and animal tissues, illustrating by numerous diagrams, and by the manipulation of pieces of dough, the various shapes assumed, the manner of absorbing food, and the curious process of cell-division.

NOVEMBER 16th.—The President in the chair. The Secretary stated that the use of a large corridor in the Crawford Municipal Buildings had been granted to the club for museum purposes.

MR. G. FOSTER read a paper entitled, "Scale Wings," in which he treated the subject of our butterflies and moths very fully, giving details of each group, the likely food-plants on which to find the larvæ, and the best modes of catching and rearing them. He illustrated the paper with a large number of specimens collected by himself, including *Bupalus piniaria* from Co. Wicklow, believed to be the second recorded capture in Ireland, also *Mamestra persicariæ* from Co. Down, a very rare moth in Ireland.

MR. COPEMAN (Hon. Sec.), also exhibited a box of insects collected du ing the club excursions.

DECEMBER 7th.—MR. D. J. O'MAHONY, in the chair. MR. J. SULLIVAN gave a paper on "Rare Irish Lichens." Having dealt very carefully with the structure, classification, and means of identification of these interesting plants, he exhibited and described a large number of specimens, being a selection from 159 new species added to the flora of Cork since the publication of Dr. Power's work on that subject in 1844. Many of the specimens shown are quite new to Ireland. Mr. Sullivan also showed a list of the new species which he is preparing for publication in the *Irish Naturalist*. At the close of the paper a discussion took place, and many questions were asked relative to the collecting, preserving, and identifying of these lowly, though, in many cases, beautiful and interesting plants, all of which were fully answered by Mr. Sullivan.

LIMERICK NATURALISTS' FIELD CLUB.

DECEMBER 13th.—This Club was organised at a meeting held at the rooms of the Protestant Young Men's Association, when twenty-five members were enrolled, and the following officers were elected:—President, Mr. Murray; Vice-President, Dr. Fogerty; Hon. Trecasurer, Mr. Stewart; Hon. Secretary, Mr. F. Neale.

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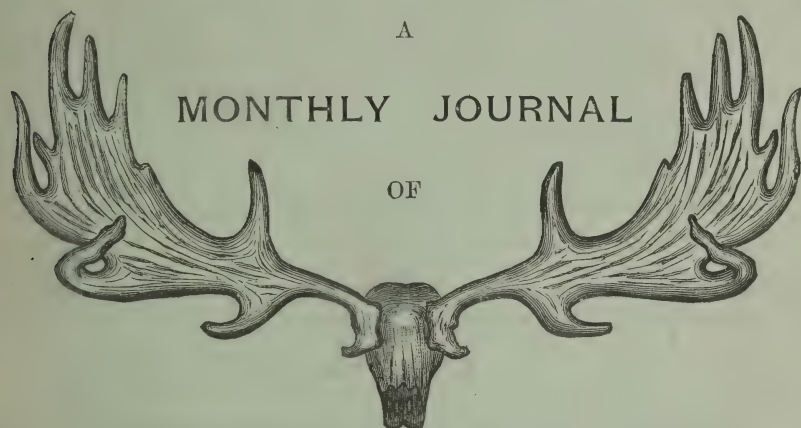
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EDITED BY

GEORGE H. CARPENTER, B.Sc., Lond.,

AND

R. LLOYD PRAEGER, B.A., B.E., M.R.I.A.

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R. LLOYD PRAEGER,
Holywood, Co. Down.

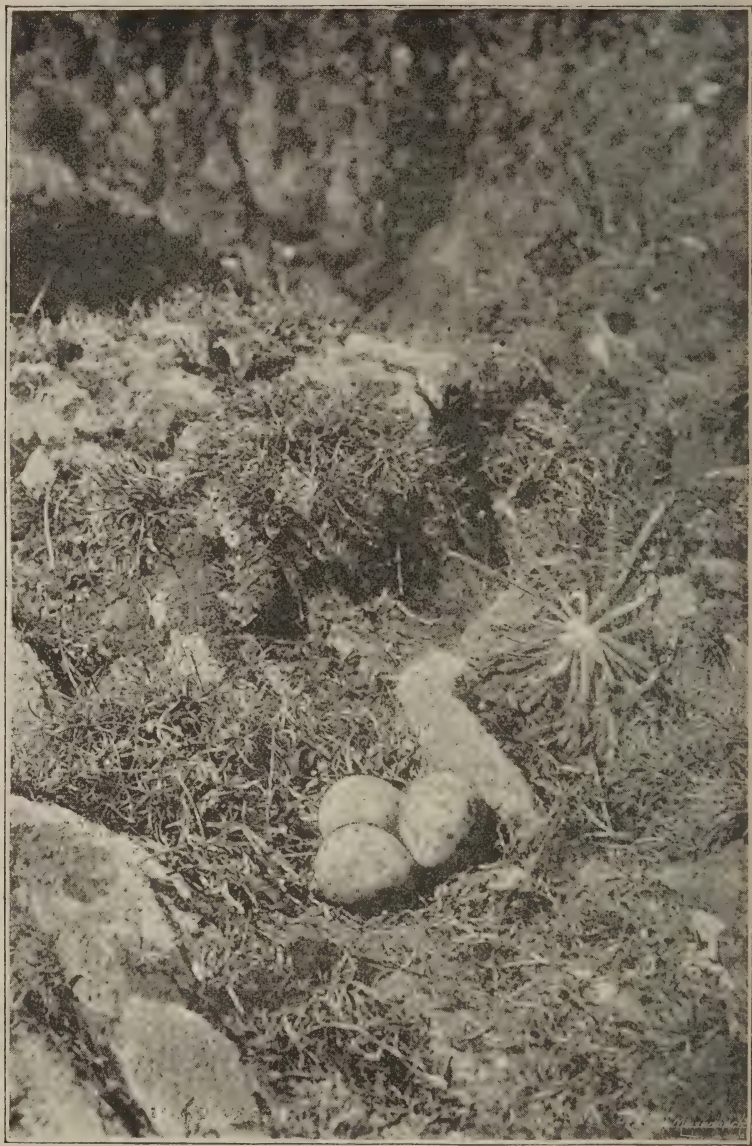
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A Reduction given for a Number of Insertions.

"The Earthworms of Ireland," REV. H. FRIEND requests specimens of worms for identification, and record in these pages; they should be sent in tin boxes with soft moss, addressed 4 The Grove, Idle, Bradford, Yorkshire; and marked "NATURAL HISTORY SPECIMENS ONLY."

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NEST OF TERN, MEW ISLAND, BELFAST LOUGH.

From a Photograph by Mr. R. Welch, June, 1892.

[See p. 68.

The Irish Naturalist.

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EGG-COLLECTING AND EGG-DESTRUCTION.

THE last two issues of our contemporary *The Annals of Scottish Natural History* contain articles upon this subject by Rev. E. P. Knubley, M.A., and Lieut-Colonel Duthie, R.A., which we would commend to the serious attention of our readers, especially since the nesting season is again at hand. The rapid disappearance of many of our rarer birds, owing to the systematic and ruthless plundering of their breeding-stations, has of late been prominently before a number of our leading naturalists and scientific societies, and the pressing importance of the question is shown by the resolution passed at the meeting of Delegates at the last meeting of the British Association :—

“The Conference of Delegates having heard of the threatened extermination of certain birds, as British breeding species, through the destruction of their eggs, deprecates the encouragement given to dealers by collectors through their demands for British-taken eggs, and trusts that the Corresponding Societies will do all that lies in their power to interest and influence naturalists, landowners, and others, in the preservation of such birds and their eggs.”

It is quite possible that in the near future legislative protection will be extended to the eggs of our rarer birds, as it is at present, during the breeding season, to the birds themselves, but meanwhile the danger impends. As Mr. Knubley says :—

“The eggs of every kind of wild bird, whether common or uncommon, useful or otherwise, are liable to be destroyed through thoughtless carelessness, wanton mischief, or sordid greed. At present there is nothing to prevent whole areas from being systematically plundered of every egg of every bird—and it is done. . . . It requires no prophet to foretell what will be the result of this system of pillage, if it is allowed to proceed unchecked.”

In Ireland, fortunately, there has not been, so far at least, the wholesale plundering that has so devastated some of the English and Scotch bird-nurseries, but it is well that we should understand the condition of affairs, and be prepared to discountenance and prevent, by every means in our power, the unnecessary destruction of birds' eggs.

Not that we would have the egg-collector abolished, or driven an exile from our shores. Oology is an interesting and instructive study, and claims our sympathy as much as the many branches of natural science which require the sacrifice of animal life. But the collector forfeits our regard who allows his greed for large series, and craze for clutches of eggs, to master the feelings of fair play and humanity which every naturalist should possess. Mr. Knubley writes :—

“Fancy fifteen clutches of the eggs of the Peregrine Falcon in the same collection, and twenty of the Chough; and what can we say of one collector whose boast it is to possess over one hundred Scottish-taken eggs of the Golden Eagle? Would he take kindly to the suggestion of one of the members of the British Association, that he should have the feathers of the birds presented to him, with the addition of a little tar?”

Colonel Duthie tersely describes the various types of egg-collecting offenders. He says :—

“There are three kinds of collectors who require to be specially dealt with, viz: the Aimless, the Greedy, and the Mercenary Collector.

“The Aimless Collector should be *discouraged*. He is generally a person who knows little or nothing about birds or their habits. His collection is an accumulation of unauthenticated specimens stored away in ill-arranged boxes, totally regardless of order, species, or locality, and is useless to himself and of no interest to science.

“The Greedy Collector should be *restrained*. He should be satisfied, as a rule, with one clutch of eggs of each bird, with an occasional addition of an abnormal clutch or egg for comparison.

“The Mercenary Collector should be *abolished*. He it is who is mainly responsible for the extermination of species and waste of eggs. His collection is the result of gold, changed into silver and copper as it filters through the hands of dealers, gamekeepers, shepherds, herd-boys, and others, who, often in direct disobedience of orders from their employers, have robbed many an important eyrie, and with indiscriminating ignorance have swept some of our bird-nurseries bare. The size and value of this collector's store depends upon the length of his purse, and while proud to tell the market value of a particular egg, he may be unable to describe the bird that laid it, or the nest in which it was found.

“The True Collector should be a Naturalist, acquainting himself with birds, their habits, flight, migration, language, and breeding haunts; his

egg-collecting being only one of the means of acquiring this knowledge. He should collect for himself, and should never receive an egg into his cabinet unless authenticated by an individual in whom he can implicitly trust. To him, therefore, no dealer need apply, and under these conditions egg-collecting has all the excitement of sport, and the final acquisition of a rare egg, after perhaps years of waiting and watching, is a triumph, and the egg is itself a trophy of which the possessor is justly proud. . . . When once the eggs of a particular bird have been obtained, they are rarely required again; but the breeding haunt being known, the return of the birds may be looked for in each succeeding year, and their habits watched and noted during the whole period of incubation."

We would also draw attention to the value of photography to the ornithologist, in affording a permanent record of the appearance of nest and eggs amid their natural surroundings. (see PLATE 3). By photographing a nest and taking careful notes, instead of plundering it, the naturalist will avoid useless sacrifice of life and happiness to the birds, and make a far more valuable contribution to science than by accumulating multitudes of empty shells displayed on cotton-wool.

Let us, then, so far as lies in our power, watch over and protect our rarer breeding birds, and discourage all unnecessary destruction of their eggs, lest, harried and persecuted, they be gradually exterminated, or be driven from our inhospitable shores to seek a securer home in far distant lands.

THE FLORA OF COUNTY ARMAGH.

BY R. LLOYD PRAEGER, B.E., M.R.I.A.

(Continued from page 38).

THE following plants I found in more or less abundance in every part of the county, and they require mention only for statistical purposes, and in order to make my enumeration of the flora complete.

<i>Anemone nemorosa.</i>	<i>R. repens.</i>	<i>Nasturtium officinale.</i>
<i>Ranunculus peltatus.</i>	<i>R. acris.</i>	<i>Barbarea vulgaris.</i>
<i>R. hederaceus.</i>	<i>R. bulbosus.</i>	<i>Cardamine flexuosa.</i>
<i>R. sceleratus.</i>	<i>Caltha palustris.</i>	<i>C. hirsuta.</i>
<i>R. flammula.</i>	<i>Nymphæa alba.</i>	<i>C. pratensis.</i>
<i>R. ficaria.</i>	<i>Nuphar luteum.</i>	<i>Sisymbrium officinale.</i>
<i>R. auricomus.</i>	<i>Fumaria officinalis.</i>	<i>Brassica campestris.</i>

- Sinapis arvensis.*
Capsella bursa-pastoris.
Raphanus raphanistrum.
Reseda luteola.
Viola palustris.
V. sylvatica.
V. tricolor.
V. tricolor var. *arvensis.*
Drosera rotundifolia.
Polygala vulgaris.
P. vulgaris var. *serpyllacea.*
Silene inflata.
Lychnis flos-cuculi.
L. githago.
Sagina procumbens.
S. apetala.
Stellaria media.
S. holostea.
S. graminea.
S. uliginosa.
Cerastium glomeratum.
C. triviale.
Spergula arvensis.
Scleranthus annuus.
Malva sylvestris.
Hypericum androsaemum.
H. tetrapterum.
H. perforatum.
H. pulchrum.
Geranium molle.
G. dissectum.
G. robertianum.
Oxalis acetosella.
Linum catharticum.
Euonymus europæus.
Olex europæus.
Sarothamnus scoparius.
Medicago lupulina.
Trifolium pratense.
T. repens.
T. procumbens.
T. minus.
Lotus corniculatus.
L. pilosus.
Vicia hirsuta.
V. cracca.
V. sepium.
** V. sativa.*
V. angustifolia.
Lathyrus pratensis.
L. macrorrhizus.
Prunus communis.
† P. communis var. *insititia.*
P. avium.
Spiræa ulmaria.
Agrimonia eupatoria.
Alchemilla vulgaris.
A. arvensis.
Potentilla anserina.
P. reptans.
P. tormentilla.
P. tormentilla var. *procumbens.*
P. fragariastrum.
Comarum palustre.
Fragaria vesca.
Rubus idæus.
Geum urbanum.
Rosa tomentosa.
R. canina.
Cratægus oxyacantha.
Pyrus malus.
P. aucuparia.
Lythrum salicaria.
Epilobium hirsutum.
E. parviflorum.
E. montanum.
E. obscurum.
E. palustre.
Circæa lutetiana.
Myriophyllum alterniflorum.
Hippuris vulgaris.
Montia fontana.
M. fontana var. *rivularis.*
** Sempervivum tectorum.*
Cotyledon umbilicus.
Chrysosplenium oppositifolium.
Hydrocotyle vulgaris.
Sanicula europæa.
Apium nodiflorum.
A. inundatum.
‡ Egepodium podagraria.
Bunium flexuosum.
Pimpinella saxifraga.
Oenanthe crocata.
O. phellandrium.
Æthusa cynapium.
Angelica sylvestris.
Heracleum sphondylium.
Daucus carota.
Torilis anthriscus.
Scandix pecten-veneris.
Chærophyllum sylvestre.
** Myrrhis odorata.*
Conium maculatum.
Hedera helix.
Sambucus nigra.
Viburnum opulus.
Lonicera periclymenum.
Sherardia arvensis.
Asperula odorata.
Galium aparine.
G. verum.
G. saxatile.
G. palustre.
Valeriana officinalis.
Valerianella olitoria.
Scabiosa succisa.
S. arvensis.
Petasites vulgaris.
Tussilago farfara.
Bellis perennis.
Pulicaria dysenterica.
Gnaphalium uliginosum.
Achillea millefolium.
A. ptarmica.
Matricaria inodora.
Chrysanthemum leucanthemum.
C. segetum.
Artemisia vulgaris.
Senecio vulgaris.
S. jacobæa.
S. aquaticus.
Centaurea nigra.
C. cyanus.
Carduus lanceolatus.
C. arvensis.
C. palustris.
Lapsana communis.
Hypochaeris radicata.
Leontodon taraxacum.
L. autumnale.
Sonchus oleraceus.
S. asper.
S. arvensis.
Crepis virens.
Hieracium pilosella.
Calluna erica.
Erica tetralix.
E. cinerea.
Vaccinium myrtillus.
Ilex aquifolium.
Fraxinus excelsior.
Erythraea centaurium.
Mentha trifoliata.
Convolvulus sepium.
Symphytum officinale.
Myosotis palustris.
M. cæspitosa.
M. arvensis.
M. versicolor.
Digitalis purpurea.
** Linaria cymbalaria.*
L. vulgaris.
Scrophularia nodosa.
Pedicularis palustris.
P. sylvatica.
Rhinanthus crista-galli.
Bartsia odontites.
Euphrasia officinalis.
Veronica scutellata.
V. anagallis.
V. beccabunga.
V. chamaedris.
V. officinalis.
V. serpyllifolia.
V. arvensis.
V. polita.

- V. hederifolia.*
Mentha aquatica.
M. sativa.
M. arvensis.
Lycopus europæus.
Prunella vulgaris.
Nepeta glechoma.
Lamium purpureum.
Galeopsis tetrahit.
Stachys sylvatica.
S. palustris.
Teucrium scorodonia.
Ajuga reptans.
Pinguicula vulgaris.
Utricularia minor.
Primula vulgaris.
Lysimachia vulgaris.
L. nemorum.
Anagallis arvensis.
A. tenella.
Plantago lanceolata.
P. major.
Littorella lacustris.
Chenopodium album.
Atriplex angustifolia.
A. hastata.
Rumex conglomeratus.
R. sanguineus var. *viridis.*
R. obtusifolius.
R. crispus.
R. acetosa.
R. acetosilla.
Polygonum amphibium.
P. persicaria.
P. hydropiper.
P. aviculare.
P. convolvulus.
Empetrum nigrum.
Euphorbia helescopia.
E. peplus.
E. exigua.
Callitriche verna.
C. stagnalis.
C. hamulata.
Urtica uren.
U. dioica.
Salix pentandra.
S. alba.
S. purpurea.
S. viminalis.
S. smithiana.
S. cinerea.
S. aurita.
S. caprea.
Myrica gale.
Betula glutinosa.
Alnus glutinosa.
- Quercus robur.*
Corylus avellana.
**Elodea canadensis.*
Orchis mascula.
O. maculata.
O. incarnata.
Habenaria chlorantha.
Listera ovata.
Iris pseudacorus.
Alisma plantago.
A. ranunculoides.
Triglochin palustre.
Allium ursinum.
Endymion nautans.
Narthecium ossafragum.
Juncus effusus.
J. conglomeratus.
J. acutiflorus.
J. lamprocarpus.
J. supinus.
J. squarrosus.
J. bufonius.
Luzula maxima.
L. vernalis.
L. campestris.
L. erecta.
Typha latifolia.
Sparganium ramosum.
S. simplex.
Arum maculatum.
Lemna trisulca.
L. minor.
Potamogeton natans.
P. polygonifolius.
P. perfoliatus.
P. crispus.
P. pusillus.
Schenus nigricans.
Eleocharis palustris.
Scirpus lacustris.
S. cæspitosus.
S. setaceus.
Eriophorum vaginatum.
E. polystachyon.
Carex pulicaris.
C. remota.
C. echinata.
C. leporina.
C. goodenovii.
C. panicea.
C. præcox.
C. pilulifera.
C. glauca.
C. flava.
C. binervis.
C. sylvatica.
C. hirta.
C. rostrata.
- C. vesicaria.*
Phalaris arundinacea.
Anthoxanthum odoratum.
Phleum pratense.
Alopecurus pratensis.
A. geniculatus.
Nardus stricta.
Phragmites communis.
Agrostis canina.
A. vulgaris.
A. alba.
Holcus lanatus.
H. mollis.
Aira cæspitosa.
A. caryophyllæa.
A. præcox.
Arrhenatherum elatius.
Triodia decumbens.
Melica uniflora.
Molinia cærulea.
Poa annua.
P. trivialis.
P. pratensis.
Glyceria fluitans.
Cynosurus cristatus.
Dactylus glomerata.
Festuca sciuroides.
F. ovina.
F. rubra.
F. gigantea.
F. gigantea var. *triflora.*
F. arundinacea.
F. pratensis.
Bromus asper.
B. mollis.
Brachypodium sylvaticum.
Triticum repens.
Lolium perenne.
Equisetum arvense.
E. maximum.
E. sylvaticum.
E. limosum.
E. limosum var. *fluviatile.*
E. palustre.
Polypodium vulgare.
Lastrea filix-mas.
L. dilatata.
Polystichum angulare.
Athyrium filix-fœmina.
Asplenium adiantum-nigrum.
A. trichomanes.
A. ruta-muraria.
Scolopendrium vulgare.
Blechnum spicant.
Pteris aquilina.

In the annotated list of rarer plants which follows, the distribution of species in the county is shown by reference to

three vice-counties—North, Mid., and South (N., M., and S.). North Armagh here means the district lying north of a line drawn through Middletown and Richhill, and includes the Pliocene, New Red, Basaltic, and Limestone areas. Mid. Armagh comprises the Silurian area as far south as a line joining Newtownhamilton and Goraghwood: and South Armagh comprises the Granite mountain district of the south-east, and the southern portion of the Silurians. These vice-counties, as well as the areas occupied by the various geological formations, are shown on the sketch-map of the county (PLATE 2). The signs used to denote the claims of species to rank as natives are those usually employed—†, possibly introduced; ‡ probably introduced; *, certainly introduced. Square brackets are used for species which have occurred merely as casuals or waifs, and not in any way established; round brackets for plants which have been recorded, but whose presence in the county is doubtful. The sign ! means that I have seen the plant in question growing in the locality described by the observer whose name is given; the abbreviation "spec.!" signifies that I have examined a specimen from the station mentioned. The following contractions are used for authorities:—

Coote's Armagh.—Sir C. Coote's "Statistical Survey of the County of Armagh," 1804.

Flor. Hib..—Mackay's "Flora Hibernica," 1836.

More N.H.R..—A. G. More, "Localities for some plants observed in Ireland," *Nat. Hist. Review*, 1860.

Flor. Ulst..—Dickie's "Flora of Ulster," 1864.

Cyb. Hib..—Moore and More's "Cybele Hibernica," 1866.

B.N.F.C..—Annual Reports and Proceedings of the Belfast Naturalists' Field Club, 1863-92.

Herb. N. H. P. S..—Herbarium of the Belfast Natural History and Philosophical Society.

G. R..—Rev. George Robinson, M.A., Armagh.

W. F. J..—Rev. W. F. Johnston, M.A., Armagh.

H. W. L..—Rev. H. W. Lett, M.A., Loughbrickland, Co. Down.

S. A. S..—Samuel A. Stewart, F.B.S.E., Belfast.

R. Lh. P..—R. Lloyd Praeger.

My best thanks are due to Mr. James Groves, F.L.S., for examining and naming my series of *Characeæ*; to Rev. W. Moyle Rogers, F.L.S., who did the same with the *Rubi*; to Mr. Arthur Bennett, F.L.S., who went through my pondweeds and Bactrachian *Ranunculi*, as well as a number of other critical plants; and to the several local gentlemen mentioned above, to whom I am indebted for valuable and willing assistance.

(TO BE CONTINUED.)

THE SILICIFIED WOOD OF LOUGH NEAGH.

BY WILLIAM SWANSTON, F.G.S.

“Lough Neagh hones! Lough Neagh hones!
You put them in sticks, and you take them out stones.”

Old Pedlar's Cry.

IRELAND is rich in legendary lore, there being scarce a river or lake throughout its green expanse which has not associated with it some wierd tale; many of these relate to their origin, while others refer, perhaps, to the virtues of their sparkling waters. It is no wonder, then, that Lough Neagh—the largest sheet of fresh water in the country—should have its strange stories. We have all heard how the mythical giant scooped the hollow which now holds the waters of the lough, and dropping the material in the Irish Sea, formed the Isle of Man. The legend which Moore has embalmed in verse points to a different source, indicative of inundation or subsidence of the area, evidence of which the strolling fisherman is credited with seeing:

“The round towers of other days
In the waves beneath him shining.”

The virtue attributed to the waters of Lough Neagh of turning wood into stone, dates from an early period, and it seems strange that, while those legends referring to the lake's origin are abandoned in this age of progress, there are still many who would hesitate to pronounce the petrifying virtue of its waters a myth. Looking into the question of the origin of the Lough Neagh petrified wood, it is astonishing how many references have incidentally been made to it; in most cases the subject being touched cautiously, writers evidently not wishing to commit themselves to a decided opinion regarding it. It has been thought that a brief resumé of these, bringing the subject in a measure up to date, would not be inappropriate to the pages of *The Irish Naturalist*.

First, however, we must briefly glance at the geological features of the district. Stretching along the southern and south-western shores of the lake, attaining an area of 180 square miles, and a thickness of several hundred feet, is a series of greyish and whitish clays, resembling pipe-clays. Boulder clay and soil are spread over their surface. To the westward these clays overlies rocks of Secondary and Primary

age; to the eastward they are said to repose on Tertiary basalts. These last extend over the adjoining counties of Antrim and Londonderry in vast level sheets, attaining a total thickness of some 1,200 feet, and containing between their successive lava-flows, deposits of earthy iron-ore with plant-remains, and occasional thin bands of lignite. The petrified or silicified wood has been found over the whole of the area occupied by these whitish clays which we have described, and fragments of it occur in boulder-drifts and other local Pleistocene deposits over a much larger area; but along the south-eastern margins of Lough Neagh especially have these trunks and branches of wood, turned into hard flinty rock, been found.

Let us now see what writers on Ireland and Irish geology have to say about the silicified wood. As early as the ninth century a writer states as follows:—

“There is another lough that hardens wood into stone. Men cleave the wood and when they have fashioned it they cast it into the lough, where it lies to the beginning of the year, and at the beginning of the year it is found to be stone, and the lough is called Lough Echach” (an early name for Lough Neagh).

In a famous but somewhat rare book “Ireland’s Natural History,” by Arnold Boate, dated about 1650, there is a section of a chapter devoted to this subject. In section 7, chapter 9, he writes:—

“Before we make an end of this chapter we must say something of the wonderful property which generally is ascribed to Lough Neagh, of turning wood into stone; whereunto some do add, to double the wonder, that the wood is turned not only into stone but into iron; and that a branch or pole being stuck into the ground, somewhere by the side where it is not too deep, after a certain space of time one shall find that peece of the stick which stuck in the ground turned into iron, and the middle, so far as it was in the water, into stone, the upper end which remained above the water keeping its former nature. But this part of the history I believe to be a fable.”

Harris, in his description of the Co. Down, 1744, goes very fully into this matter. After treating of the healing qualities of its waters, he writes:—

“The second property ascribed to this Lake—viz., of petrifying and converting Wood into Stone, challenges some Attention; and the more so, as Antiquity and universal Consent have conspired to give it this Quality. But Fable has been fruitful in adding a remarkable Particular to this Property ascribed to the Lough—viz., That the Wood is turned partly into Stone and partly into Iron.”

Harris does not seem to have been convinced of this virtue said to be possessed by the water or soil of the lough, and in an ingenious manner tries to set it aside. After enumerating the arguments given in support of the belief, he thus reviews them:—

“To the First We Answer, ‘It is now a determined point among Naturalists, *that Stones Vegetate as well as Plants*; it seems not impossible that these may be peculiar Stones, which though in the manner of their Growth they may resemble Wood, and especially Holly, yet are not from that Resemblance necessarily to be admitted such, any more than those Representations of the Shells of Cockles, Oysters, and Escalops, some forming and some formed, frequently observed in Lime-stone in the Peak of Derbyshire, are to be supposed ever to have been real Shells, or those exact Representations of Branches, of a Lion couchant, of a human Corps laid out; nay of several artificial Things, as Chairs, a Set of Organs, and innumerable other Sportings of Nature in the vegetating Lime-stone, are to be imagined to have ever been the real things they resemble.”

Many other such quaint quotations might be given, but no solid ground of investigation is touched till the publication, in 1751, of Dr. Barton’s famous lecture to the Royal Society on “The Petrifications, Gems, Crystals, and Sanative Qualities of Lough Neagh.” The learned, but very wordy Doctor quotes all that had been previously written on the subject; but his strong point is original research, and the collection of an extraordinary series of specimens which he describes in his work most minutely. The reader will kindly excuse my inflicting upon him a few of the Doctor’s paragraphs.

Turning to his third lecture on metamorphoses, he describes a specimen upon which he had a Latin inscription cut:—

“This wonderful saxo-ligneous mass is extremely hard on the outside, emitting fire, on collision with steel, in great plenty. Yet has it wood, which is very soft, internally. . . . The weight of the specimen, before a small fragment was separated, was seven hundred pounds, being weighed at the public crane in a market town.

“Specimen No. 2—A mass of wood and stone continuous is as much as two able men can lift in a frame whose joints are strengthened with iron. . . . It being the reverse of the former specimen—wood on the outside and stone within—it was necessary to frame it, that it might be fixed in so steady a manner as not to loose by friction the tender part of its substance which lay on the outside. Specimen No. 7—This stone is nearly twenty inches long and five broad; one side is ground to a flat surface, is a firm black stone, and gives a knife a good edge; the other side is wood and may be cut by that knife in several places without spoiling the edge. N.B.—There was a great quantity of wood which was broken off in the polishing.”

And so on I might quote from his descriptions of two hundred and seventy-one specimens. The point I wish specially to note in those I have quoted is, that they are part wood and part stone. Dr. Barton then describes minutely the locality—Ahaness, half a mile south of the mouth of the Glenavy river—where he found the petrifications in the greatest abundance, remarking quaintly that:—

“This place seeming to be the forge where these materials receive part of their form deserves a particular and accurate description; because future reasoning concerning these productions must in a great measure depend upon it.”

After a description of the surroundings, he says that:—

“Upon digging a pit in this place (of which there are several made), the upper stratum of matter is red clay, three feet deep; the second stratum is stiff blue clay, four feet deep; the third stratum is a black wood lying in flakes, four feet deep; the next stratum is clay, etc.”

In 1837, Dr. Scouler, of Dublin, was commissioned to examine these deposits of clay and lignite, and did so most systematically, engaging men to bore and otherwise excavate for examples. The results of this survey is given in the *Journal of the Geological Society of Ireland*, and the beds were in his opinion stated to be of 'Tertiary age,' and he further adds that “to Barton therefore is due the merit of being first to ascertain the relation of the Silicified Wood to the Lignites.”

Griffith wrote fully on these clays and lignites, and pointed out the probability of silicified wood found in the drift as having been derived from these beds.²

Portlock, in 1843, states—“In respect to the connection of the Basalts and Silicified Wood more evidence is necessary.”³

Two early members of the Belfast Naturalists' Field Club, in 1869, read a valuable joint paper before the Geological Society of London, on the “Iron Ores associated with the Basalts of the North-east of Ireland.” The iron nodules with plant-remains, found on the lough shores, are referred to, and considered identical in age with the then only known leaf-beds of Ballypallady, and all are grouped as of Miocene age.

(TO BE CONCLUDED.)

¹ *Dublin Geological Journal*, vol. i., part 3.

² Griffith—Second Report of Railway Commission, p. 22.

³ Report of the Geology of Londonderry, 1843, page 76.

AMONG THE BIRDS ON STRANGFORD LOUGH.

BY ROBERT PATTERSON.

STRANGFORD LOUGH anciently Lough Cuan, is an arm of the sea some twenty-five miles in length by four in breadth, situated in Co. Down. It is generally shallow, and scattered over its surface are a large number of small islands—366, so say the country-folk; one for every day of the year and two for Easter Sunday. According to the “Annals of the Four Masters,” Lough Cuan was formed in the year of the world 2546 (1654 B.C.) when there occurred “an inundation of the sea over the land at Brena, which was the seventh lake-eruption that occurred in the time of Partholon, and this is named Loch Cuan;” but the geologist sees in the low rounded hills of polished and ice-ground rocks that fringe the lough-shores, and in other local evidences of intense glaciation, a different origin of this shallow, island-studded inland sea.

Strangford Lough is a capital place for the naturalist in summer, as it is for the sportsman in winter. In the summer of 1890 I spent two days there with my cousin, Mr R. Lloyd Praeger, and our friend Mr. A. J. Collins, and the present sketch is compiled from our note books; our chief object was to investigate the breeding birds of the Lough.

We started on June 21st in an early train to Newtownards, armed with provisions for two days, extra rugs, to enable us to sleep on the islands if weather was suitable, boxes, vasculums, field glasses, etc. We breakfasted at Newtownards, and drove to Cuningburn, a small village about three miles down the lough, where we found our boatman, William Armour, waiting for us, and were on the water by 11 o'clock. Just as we started a Sheldrake (*Tadorna cornuta*) flew past at some little distance. On asking the boatman if Sheldrakes bred there, he replied that he believed they did, but lower down the lough. He stated that a pair or two were always to be seen in summer, and that he could get me one at any time, which statement was amply proved about a week later by the arrival in Belfast of a fine male Sheldrake in breeding plumage, and quite uninjured. The weather looked unsettled, and rain began to fall as we sailed down to Long Island and Boretree Island. As we approached, clouds of Terns rose from the

islands and circled round us, keeping up a continual shrieking that was almost deafening. On landing, we found great quantities of Terns' eggs, spotted with dark brown and black, lying in twos and threes in slightly-formed hollows in the grass, seaweed, or pebbles (PLATE 3.). The seaweed fringe which marked last spring tides seemed an especially favoured place. From among the hundreds of eggs of both Arctic and Common Terns (*S. macrura* and *S. fluviatilis*) which lay scattered over the ground, we selected a few for our cabinets, and then beat the tall groves of Alexanders (*Smyrnium*) with which the islands were covered, drenched with recent showers, in the hope of getting Mergansers', but without result. A tremendous shower now came on, which no waterproofs could keep out, and which left us and our food pretty well soaked. But we searched through it all, and found two clutches of Ringed Plovers' (*Ægialitis hiaticula*). The nest and eggs of the Ringed Plover, or "Dotterel" as it is called in the north of Ireland, are as pretty as the birds themselves. The nest consists simply of a neatly formed hollow in the dry shingle, often containing a few bright yellow shells (*Littorina obtusata*), laid there perhaps to draw attention away from the eggs. These latter are buff-coloured, speckled with black, and as they lie in the nest with the four pointed ends neatly set together, the general effect is very pleasing.

Salt Island was searched in vain, and we sailed on to Gabbock Island, near which we had a very narrow escape from being upset. During a momentary lull in the westerly wind which prevailed all day, a most extraordinary little puff came from the eastward, without the slightest warning, causing the boat to suddenly heel over, and one of our party found himself unexpectedly sitting in the sea; but the good management of our boatman saved us from a capsize, and after a hearty laugh at the expense of the wet and unfortunate third, we safely reached Gabbock. Here we camped and had lunch; the stony shores of the island yielded more nests of Terns and Ringed Plovers. We sailed on to Long and Little Sheelah, which are in close proximity. And here the Terns' eggs were a sight! We had to pick our way among them most carefully, or we would frequently have tramped on them. They lay scattered in the utmost profusion over shingle, grass, and the flotsam and jetsam that fringed high-water mark, as if they

had been sown broadcast over the islet. As the cloud of Terns, with much screaming and fluttering, settled down on the island after we had left it, we could not help wondering whether each bird was able to identify its own eggs among the hundreds that lay around, or whether each simply annexed the first clutch it came upon.

On Little Sheelah we found our first Oystercatcher's nest (*Hematopus ostralegus*). Like the Ringed Plover's, the nest was a slight hollow scraped in the shingle; the eggs are of a duller hue than the Ringed Plover's, are spotted and streaked all over with dark brown and black, and are much larger. The parent birds, whose brilliant black and white plumage, and scarlet legs and beak render the Oystercatcher one of the most showy birds of the seashore, were flying uneasily around. Then away south to Bird Island, which however belied its name, as the only eggs that we saw on the island were a clutch of Ringed Plover.

It was now getting late, and repeated heavy showers had made us very wet, so we stood away for the point of Mahee Island, on the western side of the Lough, and landed on a second Bird Island close by. When we drew near, one Red-breasted Merganser (*M. serrator*), nine Oystercatchers, and five Redshanks (*Totanus calidris*) rose off the island, but we only came upon some broken Merganser's eggs in a clump of brambles—evidently last year's eggs—and a broken Oystercatcher's egg. Cold and hungry, we made for Mahee, and claimed hospitality for the night at Stewart's farm, where we were kindly received. We got our wet things out of the boat and soon had them drying at a huge fire in the kitchen. With the help of our obliging hostess, we got out our provisions and had a great tea—Mrs. Stewart being evidently much impressed by the extent of our appetites. Three collie dogs, each answering to the name of "Sheelah," that had been rather suspicious of us at first, we pacified with huge lumps of tinned meat. After a chat with our host, and writing our notes, we three turned into one small bed—the only one available—and tried to sleep, but as one of us had put over him a rug which he found in a corner of the room, and which we discovered in the morning belonged to the *dogs*, the result was not quite as satisfactory as could have been desired. But those who did sleep dreamt of islands where the ground was paved

with eggs, and the air filled with the musical din of a thousand feathery things that dashed around like snowflakes in the eddy of a winter's gale. Our boatman, fearing a shift of wind, stayed out in the boat all night, and slept soundly, with the hard boards for a bed and the sail for a blanket.

The following morning we were up at half-past six, and after a snack of bread and a glass of warm new milk, forced a few shillings on our unwilling host, and were on the water by seven. The weather was still gloomy, but looking rather better. We ran southward and landed on Calf Island, which was barren. Then on to Sketrick Island, where we examined the ruins of the old castle, on the top of which we stood at eight o'clock, seriously disturbing the peace of a colony of Jackdaws established in the ruins. Though a large portion of the landward wall has fallen outwards, the massive square keep still stands, frowning in picturesque decay over the causeway which connects the island with the shore. How much more peaceful was the scene on which we gazed from its mossy rampart that summer's morning, than that which the O'Neill saw four hundred years ago, when having marched with his army into Clannaboy to assist his fellow chief McQuillan, he took and plundered the castle of Sgath Deirg (Sketrick), and handed it over to the keeping of his ally.

We next visited Trasnagh Island, Craigaveagh Rock, Roe Island, and Partan Island. On the latter we had good fortune, finding an Oystercatcher's, some Terns' among the seaweed, and a Merganser's with seven eggs, built among long grass and nettles at the foot of the wall of a ruined cottage. We saw the beaten track among the grass, and soon came upon a mass of down and bents; upon parting the down the beautiful drab-coloured eggs were found underneath. We could not help admiring the clever way they were concealed; the female was seen in the sea a short distance off. Then on to Darragh Island, where we landed about eleven, and had our breakfast. From this we tried Drummond Island, which was barren, as was also Great Minnis Island. Next visited Dunsey Rock, and another Long Sheelah, which yielded a few Terns', Oystercatchers', and Ringed Plovers' nests, and then stood away to Black Rock, off Ringdufferin, where we found another Oystercatcher's. On several of these islands we found numerous nests of Terns and Plovers, but the eggs had been taken.

Now we turned northward again and sailed before a gentle breeze up Ringhaddy Sound, and landed under the trees below the ruined church, which crowns the hill above. Here dinner engaged our attention for some time, and when we were ready to start it was half-past six. The wind now completely died away, and a steady rain came on. There was nothing for it but to make our belongings as weather-proof as possible, and pull all the way back; so we set out on our long row of nine miles through the mist and rain, and against the tide, and slowly came up through the islands, past the point of Mahee, where we could see our hospitable farmhouse, across the lough, and reached Cunningburn as darkness was setting in, at half-past nine. It was dead low water, and as we could not have been much wetter, we just waded ashore as we were, carrying our belongings on our backs. We left all we could in our boatman's cottage, and taking our bags and our precious eggs, set off at ten, and tramped back into Newtownards, where, towards midnight, we made night hideous with frantic efforts to awaken the people of the Ulster Hotel. A man in a state of hilarious inebriation, who happily turned up, advised us to try the Londonderry Arms instead, where after a lengthened solo on the knocker, we effected an entrance, and lost no time in getting to bed. The following morning we returned to Belfast by an early train.

During our two days on the water, which, in spite of unsettled weather, were most interesting and enjoyable, we saw many Cormorants, Herons, Curlews, Green Plover and Black-headed Gulls, but I have no notes of any importance. The only eggs we found in addition to those already mentioned were one Rock Pipit's and one Land-rail's. The Rock Pipit's egg was lying among bare gravel, without a trace of nest; the Land-rail's was in a grove of *Smyrnium*, also without nest; the Ringed-plover's and Oystercatcher's, were, as before stated, among gravel, in a slight hollow, in which a few bright shells had been laid—some of the former were overhung by grass.

We observed that all the Oystercatchers' eggs were laid at a *point* on the islands; never in the middle of a straight stretch of shore. The Lesser Tern (*S. minuta*), we did not see at all, although a close watch was kept; later on in the summer, however, I saw specimens which were procured on Strangford Lough. We made enquiries also about the Roseate Tern (*S. dougalli*), but without result.

By the kindness of my friend Mr. R. Welch, I am enabled to give the illustration (PLATE 3) which accompanies this paper. It is a photograph of the nest and eggs of a Tern (Arctic or Common) on Mew Island, at the entrance of Belfast Lough; here the birds usually lay in slight hollows which they form in the short turf which covers the rocky surface of the island.

THE MACRO-LEPIDOPTERA OF THE LONDONDERRY DISTRICT.

BY D. C. CAMPBELL.

(Concluded from page 46.)

GEOMETRÆ.

Uropteryx sambucaria, Linn.—Rare. Mr. Milne has noticed that the conspicuous swallow-tail often falls a victim to bats, probably owing to its large size and pale yellow wings. This beautiful species was one of the prizes of our early collecting days.

Epione apiciaria, Schiff.—Common at Ballynagard; we took it on Ragwort.

Rumia luteolata, Linn.—Very common.

Metrocampa margaritaria, Linn.—Common.

Ellopia prosapiaria, Linn.—Local. Very common at Kilderry among Scotch firs. We found it very easily attracted by light.

Selenia bilunaria, Esp.—Common.

Odontoptera bidentata, Clerck } Common.
Crocallis elinguarla, Linn. }

Eugonia quercinaria, Hufn.—One or two specimens at Ballynagard.

Himera pennaria, Linn.—A few specimens.

Phigalia pendaria, Fab.—Fairly common.

Nyssia zonaria, Schiff.—In June, 1883, we discovered this interesting species near Ballycastle, Co. Antrim. Mr. Milne found the first larvæ on the short grass on the wind-swept shore. We found the larvæ very abundant and succeeded in rearing a large number. Their favourite food was *Lotus corniculatus*.

Amphidasys betularia, Linn.—Common.

Cleora lichenaria, Hufn.—We took one perfect specimen and four or five larvæ at Rathmullen.

Boarmia repandata, Linn.—Common.

Gnophos obscuraria, Hüb.—One specimen at the Giant's Causeway.

Geometra vernaria, Hüb.—Rather rare.

Iodis lactearia, Linn.—Common at Buncrana.

Venusia cambrica, Curt.—One or two specimens at Innishowen.

- Acidalia dimidiata**, Hufn. }
A. bisetata, Hufn. } Common.
A. trigeminata, Haw. }
A. aversata, Linn. }
Cabera pusaria, Linn. } Very common.
C. exanthemata, Scop. }
Halia vauaria, Linn.—Rare.
Numeria pulveraria, Linn.—Buncrana.
Scodlona belgiaria, Linn.—Rare.
Ematurga atomaria, Linn.—Common.
Abraxas grossulariata, Linn.—Common.
Lomaspilis marginata, Linn.—We have only found it in one locality—Kilderry, six miles from Derry.
Hyberniarupicapraria, Hüb. } Common.
H. marginaria, Bork. }
H. defoliaria, Clerck—Fairly common.
Chelmatobia brumata Linn.—Very common.
Oporabia dilutata, Bork.—Common.
O. filigrammaria, Herr.-Schäff.—We reared one specimen from larvæ.
 This species was not included in Mr. Birchall's list.
Larentia didymata, Linn.—Very common.
L. multistrigaria, Linn.—Distributed, but not abundant.
L. cæsiata, Lang—Common.
L. salicata, Hüb.—Not common.
L. viridaria, Fab.—Common.
L. olivata, Bork.—Two specimens at Buncrana.
Emmelesia alchemillata, Linn. } Common.
E. albulata, Schiff. }
E. unifasciata, Haw.—One or two specimens.
Eupithecia venosata, Fab.—Common on coast near Magilligan.
E. pulchellata, Steph. }
E. oblongata, Thunb. } Common.
E. castigata, Hüb. }
E. vulgata, Haw. }
E. rectangulata, Linn. } Not common.
E. virgaureata, Dbl. }
Lobophora sexalisata, Hüb.—A few specimens.
L. carpinata, Bork.—Two specimens.
Thera variata, Schiff.—Very common.
Hypsipetes trifasciata, Bork. } Common.
H. sordidata, Fab. }
Melanthia bicolorata, Hufn. } Common.
M. ocellata, Linn. }
M. albicillata, Linn. }
Melanippe hastata, Linn.—One specimen.
M. sociata, Bork. } Common.
M. montanata, Bork. }
M. gallata, Hüb.—Magilligan, rather rare.

- Melanippe fluctuata**, Linn.—Common.
Anticlea badlata, Hüb.—Not common.
Coremia munitata, Hüb.—Common, but local.
C. ferrugata, Clerck } Common.
C. unidentaria, Haw. }
Camptogramma bilineata, Linn.—Common.
C. fluviata, Hüb.—One male specimen at Cushendall, on Antrim coast.
Phibalapteryx vittata, Bork.—Rare.
Triphosa dubitata, Linn.—Two specimens.
Cidaria siterata, Hufn.—One specimen at ivy.
C. miata, Linn.—Not common.
C. corylata, Thunb.—A few were taken by a friend in Co. Derry.
C. truncata, Hufn. }
C. immanata, Haw. } Common.
C. suffumata, Haw. }
C. silaceata, Hüb.—Strabane.
C. prunata, Linn. } Common.
C. testata, Linn. }
C. populata, Linn.—Abundant on Innishowen mountains.
C. fulvata, Forst.—Common.
C. dotata, Linn.—Common at Magilligan.
Pelurga comitata, Linn.—Common.
Eubolia limitata, Scop.—Common.
E. plumbaria, Fab.—Two or three specimens.
Anaitis plagiata, Linn.—Common.
Chesias spartiata, Fues.—Common.
Tanagra atrata, Linn.—One specimen. Mr. Milne has seen it in numbers in Co. Tyrone.

CORRIGENDA.

Chærocampa elpenor, L. should be added to the Sphinges (p. 21).
 We took a few specimens near Derry.

Mr. Kane has pointed out to me that *Hadena dissimilis* was inserted by error among the Noctuæ (p. 46). This species should have therefore been omitted. Mr. Leeboddy draws my attention to the fact that *Artemisia campestris* (mentioned as the food-plant of *Heliothis scutosa*) does not grow at Buncrana; it is *A. vulgaris* which occurs there.

Our list contains but 261 species and is, of course, very incomplete. If any of our Irish naturalists will investigate the Lepidoptera of the district about Lough Swilly and Lough Foyle, I feel sure he will be amply rewarded. The great stretch of sandhills which runs almost across the mouth of Lough Foyle, at Magilligan, provides a splendid field for the naturalist, be he entomologist, botanist, or conchologist. If one wants a day of pure pleasure, let him choose a fine warm day in June or July, and stroll through the Magilligan valleys, where the exquisite grass of *Parnassus* carpets the ground, and the pearly white wild rose blooms close beside the beach where the Atlantic waves break unceasingly.

NOTES ON THE FLORA OF THE ARAN ISLANDS,

BY NATHANIEL COLGAN.

SMALL insular areas have always had a peculiar attraction for students of Natural History, perhaps for this reason, among other and weightier ones, that they present to the investigator a field of inquiry clearly defined by unmistakable natural boundaries, and not so extended as to discourage minute and thoroughgoing examination. Just such an area is to be found in Galway Bay, in the group of three limestone islands known as the South Isles of Aran, a group which amongst botanists, at least, has made its attractions felt from an early period. The first investigator to visit the islands was Dr. Edward Lhwyd, that intrepid explorer of the Irish flora, who in his account of his plant-hunting "On the Mountains of Keri," in the year 1700, tells us how his scientific curiosity was "frustrated by the Tories."¹ To Lhwyd we owe the earliest record of the Maiden-Hair Fern in the Arans. A century later (1805), we find Dr. Mackay, author of the "Flora Hibernica," visiting the group and discovering there the *Helianthemum canum*; and after him, at more or less lengthy intervals, comes a succession of botanists down to Mr. H. C. Hart, who made a careful survey of the islands in the summer of 1869. Mr. Hart's results were published in 1875 in the form of a detailed flora carrying up the number of species for the Arans from 159, recorded by Dr. E. P. Wright in 1866, to a total of 372. Finally, in 1890, two English botanists, Messrs. J. E. Nowers and James G. Wells, visiting the islands at a season two months earlier than Mr. Hart, succeeded in adding no less than 42 species to his total.

It will thus be seen that no great extension of the number of Aran species was to be looked for from further examination of the group; and it was with no such expectation I visited the islands towards the end of last May (1892). My object was merely to make acquaintance with the peculiar Aran species, to re-discover, if possible, the long derelict *Ajuga pyramidalis*, one of the rarest of Irish plants, first found in Aranmore by

¹ *Phil. Trans.*, vol. xxvii., 1712. It need hardly be said that the Tories here referred to professed no definite political principles, but were mere footpads who found in the fastnesses of the Kerry Highlands a favourable field for brigandage.

Mr. David Moore in 1854, and to search for *Neotinea intacta*, which had just been discovered in a new station on the neighbouring limestone of the Co. Clare, and in the opinion of my friend, Mr. A. G. More, was extremely likely to re-appear on the similar formation of the Arans.

It was mid-day on the 25th May when I landed at Kilronan, in Aranmore, after a passage of three hours and a half by steamer from Galway; and about mid-day on the following Monday I returned to the mainland, taking advantage of a favourable wind to cross by hooker from Inisheer, or South Island, to the nearest point of the Iar-Connaught coast at Inverin. This stay of five days was insufficient for anything more than a hasty survey of the islands; for short as the distances are—Aranmore, the largest of the group, being only nine miles long with an average breadth of a mile-and-a-half—progression, off the highways, is made extremely slow and extremely trying to the temper and the muscles by the extraordinary wealth of dry stone walls which chequer the surface of the country. Each of these walls is a triumph of equilibration, and except in parts of the South Island, where passages wide enough for a man but too narrow for a sheep are occasionally left, no breach can be found in these crazy ramparts. You can only pass from one field to another, to dignify by the name of field the areas of naked and crevassed limestone covering almost three-fourths of the surface, by climbing what is almost impossible to climb without imminent risk of bruised shins or heels. My first day's work amongst these stone dikes was so tedious and so disheartening that on the following days I engaged a stout native boy who proved very useful, rather as a dilapidator than as a guide and porter. He carried my camera and vasculum, and cheerfully threw down with a push of his shoulder any uncommonly difficult or dangerous wall that happened to lie in our path. I should have hesitated to do this for myself; but the young islander, with an adroit touch of flattery, gave me to understand that though the natives would be loath to take such a short method with the walls for their own convenience, they would never dream of objecting to its use on behalf of a distinguished stranger. By this means I was enabled to examine a large part of the surface of the islands in my short stay.

During the first day's ramble in Aranmore the prevalence of

markedly limestone species such as *Rubia perigrina*, *Asperula cynanchica*, *Galium sylvestre*, *Poterium sanguisorba*, *Asplenium trichomanes*, and *A. ruta-muraria* made itself apparent. At the same time I was struck with the rarity of another apparently lime-loving species, *Ceterach officinarum* so abundant on the limestone to the east of Galway. In Inisheer, or South Island, this fern seems quite as rare as on Aranmore, though on Inishmaan, or Middle Island, Mr. Hart found it in great profusion and luxuriance. Of species with a less strongly-marked preference for limestone, *Geranium lucidum*, *Rubus saxatilis*, and *Saxifraga tridactylites* were very abundant, the last-named frequently reaching to a height of more than six inches, while among ferns it would be hard to say whether the commonest species in Aranmore is *Scolopendrium vulgare* or *Pteris aquilina*. Both are extremely abundant, but whereas the Hart's Tongue, which seems to have a rather well-marked predilection for limestone, grows most vigorously in the rock-clefts, the Bracken is everywhere very stunted. Even more stunted in growth, as observed by Mr. Hart, was *Eupatorium cannabinum*, plentiful in the maze of rock-fissures below the grand old cyclopean stone fort of Dun Ængus, where it contended for shade and moisture with the Maiden-Hair, only now beginning to send up its tender young fronds amongst the withered foliage of last year.

At this season the most striking of all species, both in mass and brilliancy of flower, appeared to be *Lotus corniculatus* and *Geranium sanguineum*; while, perhaps, even more abundant, if less obtrusive, were *Cerastium arvense* and the form of hypnoid saxifrage, *Saxifraga sternbergii* (Willdenow), usually regarded as peculiar in the British Isles to Ireland. Having compared this Aran saxifrage with other hypnoid forms which I have gathered on Seafin, in the Ben Bulbin district of Sligo, and at a height of 3,000 feet on Brandon in Kerry, I find that while the Aran plant is decidedly distinct from the typical *Saxifraga hypnoides* of Sligo, with bristle-pointed leaves and bulbiferous axils, it is hardly distinguishable by any important character from the Brandon specimens. The Brandon plant is evidently the same as that described by Mackay and Babington under *S. hirta* (Smith), but the dense hairiness and greater laxity of growth of this mountain form is all that separates it from the *S. sternbergii*, which grows so

profusely down to sea-level in the Arans. And the Aran form, when growing in moist situations, frequently approaches in laxity of growth to the Brandon *S. hirta*, so that the sole remaining distinction left between the two forms is to be found in the more profuse hairiness of the alpine plant. Under change of conditions all the forms of this bewildering group are probably highly flexible. A very weak straggling form which I gathered last July on Crookaline mountain, north-east of Lough Currane, Co. Kerry, at a height of 1,800 feet, where it grows profusely in mossy rills, entangled with luxuriant *Chrysosplenium*, has developed, when grown in an open situation in my garden, into a cushion of dense even-headed rosettes. A serious attempt to reduce to order the Irish hypnoid saxifrages by a study of a full series of authentic dried specimens, and of plants under cultivation from Aran, Kerry, Ben Bulbin, and Antrim, might, perhaps, give some positive results.

The second day in Aranmore was given up chiefly to an examination of the sandy tracts around Killeany, towards the south-east of the island, and the most notable result was the discovery of a quantity of the elegant little *Astragalus hypoglottis*, nowhere native in Ireland outside the Aran Islands. Lough Atalia, a brackish pool near the shore of Killeany bay, was carefully searched, and, though I failed to discover *Menyanthes*, recorded from this station by Mr. Hart, I found here the only horsetail of the islands, noted but not determined by him in August, 1869. It turns out to be *Equisetum arvense*. Close by the same pool a few plants of *Lysimachia nemorum* turned up, a species apparently not recorded from these islands since the visit of Dr. Wright in 1866. The stately *Allium babingtonii* was abundant, both in sandy places near the shore, and in deep clefts of the rock. This species, the "Inyon feechaun,"¹ or wild onion of the islanders, was formerly grown in small quantities in the garden plots of the Arans for use as an anthelmintic; but I could discover no certain tradition that it had ever been grown for culinary purposes. *Allium ursinum*, the "Gaurllyoge" or Garlic of the natives, is thoroughly well-established in rock-terraces close by Lough Atalia at a distance from ruins or dwellings.

(TO BE CONCLUDED.)

¹ Throughout these notes I have endeavoured to represent phonetically the Irish plant names.

REVIEWS.

Birds : The Elements of Ornithology. By ST. GEORGE MIVART, F.R.S. London : R. H. Porter, 1892.

Mr. Mivart's book may briefly be described as about the most comprehensive science-primer which the student of ornithology is likely to have met with. Its opening pages, indeed, scarcely prepare one to expect this characteristic. Nearly the first half of the volume consists of a copiously illustrated introduction, in which, beginning with the Common Fowl, our author passes in rapid review more than 200 species of birds, 140 of the kind referred to being also figured from original drawings. Though this chapter has in truth little apparent connection with the rest of the treatise, and is professedly written with a view to enabling the student to obtain a mental grasp of the outlines of Cuvier's arrangement of birds, it is not easy to regret the adoption of a course which has certainly embellished the volume, and contributed one popular chapter to a strictly scientific work. Still the reader who has gone to Mr. Mivart in due ignorance of Cuvier's classification will be somewhat perplexed at finding himself required to learn, and retain in memory, for convenience' sake, to the end of the book, a system, against which he is at the same time gravely cautioned is not only superficial but obsolete. Here and there, in the course of this chapter, one drops on amusing instances of the modern tendency to speculation. Thus, in explanation of the remarkable habit acquired by the Kea Parrot (*Nestor notabilis*) of New Zealand, which, since the introduction of sheep into that colony, has taken to carnivorous practices, alighting on the helpless animal's back, and eating down into its kidneys, Mr. Mivart tenders the curious suggestion (due, it appears, to the ingenuity of Dr. H. Woodward, F.R.S.), that this parrot, in pre-colonial days, was used to prey in similar fashion on the now extinct *Dinornis*!

The remaining chapters deal respectively with the external structure, internal skeleton, development, geographical distribution, and classification of birds. In the last-named department, Mr. Mivart seems to have been fortunate in securing the important assistance of Dr. R. Bowdler Sharpe, whom, indeed, we are asked to regard as responsible for the entire arrangement of the 53 families of Passeres. The arrangement of the orders is as follows:—(1) Passeriformes, (2) Coraciiformes, (3) Piciformes, (4) Coccozyges, (5) Columbiformes, (6) Psittaci, (7) Raptores, (8) Steganopodes, (9) Herodiones, (10) Alektorides, (11) Galliformes, (12) Limicoliformes, (13) Tubinares, (14) Pygopodiformes, (15) Lamelliostres, (16) Impennes, (17) Crypturi, (18) Struthiones. The position of priority in the whole class is assigned to the Rook, dimly recognizable as *Trypanocorax frugilegus*. A little carelessness is noticeable in that part of the work dealing with geographical distribution. For example, Mr. Mivart makes (on pp. 117, 244, and 248) three statements respecting the range of the Pycnonotidae, each of which contradicts both the others. But such occasional symptoms of hasty writing will not seriously detract from the value of this interesting and welcome publication.

C. B. M.

The Hemiptera Heteroptera of the British Islands. By EDWARD SAUNDERS, F.L.S. London: L. Reeve & Co., 1892. 14s. (with coloured plates, 48s.).

This is an excellent work on the British species of a comparatively neglected group of insects, and should lead many entomologists to take up its study. Mr. Saunders, who is a well-known authority on the Hemiptera, gives us an introduction on the anatomy of the order, with hints on collecting (we are glad to see that he insists on recording the locality of captures), and clear synopses, with full descriptions of the families, genera, and species found in the British Islands. The arrangement of the families is that of Puton, and the nomenclature has been brought well up to date. The cheap edition is without illustrations, except one good structural plate; but the descriptions are so excellent that the careful student should not fail to correctly identify his captures.

A list of known British localities is appended to each species. Records from Ireland are not very numerous. Our esteemed contributor, Rev. W. F. Johnson, is responsible for most of them. We notice that in the last issue of the *Ent. Monthly Mag.* (Feb., 1892) he enumerates 89 species of Heteroptera, and 13 of Homoptera, from the north of Ireland. We hope that other entomologists in the country will take up the study of these interesting insects, and so increase our knowledge of animal distribution in the British Isles.

Report on Some Species of the Genera *Buccinum*, *Buccinopsis* and *Fusus* Dredged off the South-west of Ireland.

By HENRY K. JORDAN. *Proc. Royal Irish Acad.* (3) vol. ii., pp. 391-396.

This communication has a certain amount of value to the systematist but scarcely any from a faunistic point of view. Of the twenty-eight records of species, the only locality whence they were obtained is that contained in the title of the paper; "Jars A-F," and "Boxes 1-7," are not edifying localities! Incidentally we learn that Box 4 was marked "Station 3, 1885," and Box 7, "Exp. 1886, log. 44, 108 fms.," but no further reference is vouchsafed. This is slovenly work. The species recorded are *Buccinum undatum*, Linn.; *B. humphreysianum*, Ben., and its var. *ventricosum*, Kien. Mr. Jordan states that "the specimen under notice clearly connects the two species" (*B. humphreysianum* and *B. ventricosum*, Kiener). *Buccinopsis dalei*, J. Sow.; *Fusus antiquus*, Linn., "intermediate in form between *antiquus* and *despectus* of Linn." *F. despectus*, Linn.; *F. islandicus*, Chem.; *F. gracilis*, Da Costa; *F. propinquus*, Ald., "and at least two new varieties,"—var. *intermedia*, Jordan (connecting *F. propinquus* and *F. jeffreysianus*), var. *nana*, Jordan, and possibly a third, var. *incrassata*; *F. jeffreysianus*, Fisch.; *F. berniciensis*, King (first Irish specimens); *F. fenestratus*, Turt. "*B. ventricosum* of Kiener—a Lusitanian and Mediterranean form—is new to the British fauna, and its connection with *B. humphreysianum* is established. Again, it is in company with *F. islandicus*—a boreal and Arctic species." It is not quite clear what Mr. Jordan means by "in company," as the former was in "Jar C," and the latter in "Jar A," and we are kept in the dark where either came from.

A. C. H.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a Peregrine Falcon from Miss Dennis; a Badger from E. Winter, Esq.; and a pair of Dormice from Dr. Kenny. An opossum, a Ring-tailed Coati, two Spider-Monkeys, and four marmosets have been purchased. 3,420 persons visited the Gardens in January.

DUBLIN MICROSCOPICAL CLUB.

JANUARY 19th.—The Club met at Dr. FRAZER'S.

Epithelial carcinoma, from the human subject, was exhibited by Dr. E. J. M'WEENEY, showing the peculiar globular bodies which have been described by Sjöbring, Podwyszwski and Sawbschenko, Foà, Ruffer and Walker, and Metschnikoff, as occurring imbedded in cancer cells, sometimes in the nucleus and sometimes in the protoplasm, and which are looked on by these authors and others as parasitic Protozoa allied to the Gregarinida. Owing to assumed symbiosis between these intracellular parasites and the epithelial cells, the latter are supposed to receive a peculiar stimulus causing them to multiply to a degree prejudicial to the interests of the organism at large, and thus form a tumour. The sections had been cut in paraffin, arranged in series on the slide, and stained with Biondi's reagent. Dr. M'Weeney also exhibited a series of slides illustrative of the various kinds of intracellular infection that exist among the lower animals. The psorosperms of the liver and intestine of rabbits; the sarcosporidia that inhabit the muscular fibres of pigs and sheep, and the myxosporidia that live in the swim-bladder and urinary bladder of fishes were clearly demonstrated in this series of beautifully stained sections, for which the exhibitor was indebted to his esteemed correspondent, Dr. L. Pfeiffer, of Weimar, whose researches have thrown much light on the obscure field of comparative pathology. These minute organisms have one feature in common—their plant-like tendency to break up completely into spores, and this process of spore formation has lately been described as occurring in the supposed parasite of human cancer cells. He also exhibited a series of micro-photographs also lent by Dr. Pfeiffer, showing cancer parasites in man, and the various kinds of parasitic Protozoa in insects, mollusca, and vertebrates, at different stages of development.

Dr. J. A. SCOTT also showed some of the coccidia-bodies recently described as a possible cause for cancer. The sections were taken from a case of Paget's disease and an epithelioma of the tongue. He also exhibited two photographs, by Mr. Pringle of London, of a cancer. In all the specimens and photographs similar small spherical bodies could be seen in the cells of the new growth, but their exact import must still remain an open question.

Anchorella uncinata, a parasitic Copepod (male) was exhibited by MR. W. F. DE V. KANE, who said this species was not uncommon on Codfish in Dublin Bay. He showed that this sex, which continues as a free organism all its life, retains the two pairs of maxillipeds, situated in juxtaposition and provided with talons, and lives as a parasite on the female. The latter, however, in its fixed adult stage has both pairs diversely modified and altered in their relative positions, the inner pair being retained as minute buccal appendages, while the outer pair are separated from them by the whole length of the cylindrical cephalic process, and are placed at its basal extremity, where they are soldered together and form a button-shaped tenaculum, which is immovably fastened into the skin of the host. He further remarked that in the present species, and in those of the genus *Chondracanthus*, the microscopically minute male seemed only to be found on the genital ring of the female, whereas, in other *Lernæo-*

podida whose male is easily discernible by the aid of an ordinary lens, they are found clinging to other portions of the female. The female of the present species was also shown, and measures about five lines in length from the mouth to the extremity of the ovaries.

Lejeunea diversiloba, Spruce, was exhibited by MR. MCARDLE. This liverwort is one of the *Microlejeuneæ*, and is remarkable for the irregularity of the lobule. This is often equal to the leaf in size, more frequently half as large, sometimes reduced to a mere rim, and on some of the branches the lobule is altogether obsolete. The plant is very rare, and has only been found at Killarney, from which locality the specimen exhibited came. He also showed a drawing of the plant with the peculiar parts magnified, as well as the folioles, perianth, and cells.

Pollen Grains of Encephalartus villosus were exhibited by MR. HENRY H. DIXON, in the first stages of germination. The ripe pollen-grain is oval in longitudinal section, reniform in transverse. It has three nuclei, two of which are lenticular, and are applied to the portion of the inner coat of the pollen-grain, opposite the point where the pollen-tube will be protruded. The remaining nucleus moves into the pollen-tube as soon as the latter is formed; neither of the lenticular nuclei, up to the sixth day of germination, when the pollen-tube was about twice as long as the diameter of the grain, had moved into the tube.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

JANUARY 27th.—The President (PROF. FITZGERALD) in the chair. MR. J. MURPHY read a paper on "The Division of Angles and Arcs by Mechanical Methods."

FEBRUARY 7th.—The President (PROF. FITZGERALD) in the chair. MR. F. FRANKFORT MOORE read a paper entitled "An Artificial Age."

BELFAST NATURALISTS' FIELD CLUB.

JANUARY 17th.—The President (MR. J. VINYCOMB) in the chair. PROF. A. C. HADDON gave a lecture on "The Aran Islands: a Study in Irish Ethnography." There was a very large attendance. The subject-matter of this lecture will be shortly laid before our readers in a paper by Prof. Haddon.

JANUARY 18th.—MR. W. H. PATTERSON in the chair. Adjourned meeting. PROF. HADDON described the steps now being taken by a committee of the British Association to carry out an ethnographical survey of the British Islands. A local committee was appointed to carry on the work in Ulster.

FEBRUARY 9th.—Microscopical Section. The Chairman (MR. ALEX. TATE, C.E.), presided. MR. H. MCCLEERY read a paper on "The Honey Bee," which was illustrated with the lantern microscope by Mr. John Brown. MR. JOHN DONALDSON gave an exposition of Photo-micrography, with illustrations.

DUBLIN NATURALISTS' FIELD CLUB.

FEBRUARY 14th.—The President (DR. M'WEENEY) in the chair. MR. GREENWOOD PIM read a paper by himself and DR. M'WEENEY on "Some Recent Additions to the Fungal Flora of the Counties of Dublin and Wicklow," which will be published in *The Irish Naturalist* during the present year.

MR. J. J. DOWLING read some notes on the use of a hand-camera in the study of natural history, exhibited a home-made hand-camera, and showed in the optical lantern photographs taken with it.

MR. R. M. BARRINGTON showed an Antarctic Yellow-billed Sheathbill (*Chionis alba*), from Carlingford Lough (see *I. Nat.* ii., p. 56).

MR. W. F. DE VISMES KANE showed some female specimens of *Par-nassius*, with reference to Scudder's late investigation as to the formation of the abdominal pouch in females of this genus.

MR. GREENWOOD PIM showed an old Topographical Map of Counties Dublin and Wicklow.

LIMERICK NATURALISTS' FIELD CLUB.

JANUARY 17th.—DEAN BUNBURY in the chair. Dr. W. A. FOGARTY delivered an address, illustrated by diagrams and living microscopic examples, on "Some Low Forms of Animal Life."

Mr. J. STEWART showed male and female specimens of the Emperor Moth (*Saturnia pavonia*), also entire cocoons of the species, exhibiting their formation and the position of the contained pupæ.

Mr. F. NEALE showed specimens of the Silver-Washed Fritillary (*Argynnis paphia*), from Cratloe, Co. Clare, one of them having the left wings marked as in males of the type, whilst the right wings showed as in the typical females.

FEBRUARY 15th.—Dr. W. A. FOGARTY, Vice-President, in the chair. MISS BENNIS read a paper on "Plants, the Structure and Functions of their Organs," illustrating the subject by diagrams and specimens. Mr. Belshaw, Mr. Taylor, Mr. Moroney and others took part in the discussion which followed.

Dr. FOGARTY exhibited a piece of osier, showing "*fasciation*" to a remarkable extent.

Mr. BELSHAW showed the large fins or "wings" of a flying fish.

Mr. F. NEALE showed specimens of the Reed Mace (*Typha latifolia*) in the stems of which, when gathered last August, he found some pupæ, the identity of these latter not being as yet established.

NOTES.

BOTANY.

FUNGI.

Trichia chrysosperma, DC.—Some moss which reached me from Valencia, Kerry, as packing for earthworms, was covered with very beautiful specimens of this fungus. This may be of interest as a record of distribution.—HILDERIC FRIEND, Idle, Bradford.

PHANEROGAMS.

Plants still flowering in latter end of December.—On December 27th I went for a ramble in the Ballyhooley suburbs of Cork City, N.E., and found the following species:—*Capsella bursa-pastoris*, *Arabis hirsuta*, *Bellis perennis*, *Stellaria media*, *Trifolium pratense*, *Euphorbia peplus*, *Petarsites vulgaris*, *Senecio vulgaris*, *Veronica chamaedrys*, *Lamium purpureum*, *Ulex europæus*, the six last mentioned very abundant. In a garden in the same district I gathered *Primula vulgaris*, *P. veris*, *P. elatior*, *Fragaria*. These all testify to the extreme mildness of our southern climate up to the above date.—ANNA N. ABBOTT, Cork.

A Sedge new to Britain.—In the *Journal of Botany* for February, Mr. R. Lloyd Praeger announces the discovery in Co. Armagh, of the fine sedge *Carex rhynchophysa*, C. A. Meyer, a native of Russia and Scandinavia, and not previously known to occur in the British Isles. An excellent figure and description of the plant by Mr. Arthur Bennett, F.L.S., accompanies the paper.

Festuca sylvatica in Co. Cork.—Mr. R. W. Scully writes to the *Journal of Botany* that he has added this handsome grass to the flora of Co. Cork, having found it in 1891 growing in a rocky wood overhanging the Glanmire estuary.

The Flora of Donegal—A Correction.—Mr. H. C. Hart, F.L.S., writes us, as follows:—"Kindly correct an error on page 15 of your last [January] issue.—'The flora of Donegal, I am informed by Mr. H. C. Hart, comprises about 720 species.' I informed Mr. Praeger that I had not decided at what figure to place the flora of Donegal, as it depended on how far *Rubi* and *Hieracia* were to be admitted as counting towards the total. If I count each form of bramble and hawkweed as a 'species,' my total will very considerably exceed Mr. Praeger's estimate."—EDS.

Mr. Hart wrote me, *re* flora of Donegal, under date September 23rd, 1892—"If I adopt new London catalogue, it would be a good lot over 700, if I adhere to Hooker it would reduce the total, but certainly not below the 700." The figure I quoted (720) was based on this statement, coupled with Mr. Hart's numerous published papers on the Donegal flora; I regret if it is below the mark. My phrase "I am informed by Mr. Hart," should read "I infer from information supplied by Mr. Hart."—R. LLOYD PRAEGER.

ZOOLOGY.

MOLLUSCS.

Additional Localities for Irish Land and Freshwater Mollusca.—I record a few localities in which I have taken Land and Freshwater Mollusca, not included in Dr. Scharff's most interesting articles (*J. N.* vol. i.). I am much indebted to Dr. Scharff for help in identifying specimens of which I did not feel sure. *Vitrina pellucida* occurs in Districts I. and XI. From my experience of the variety of surroundings in which this is found, I am sure District III., the only blank at present, will speedily be included in its distribution; *Hyalinia cellaria* is abundant in XI.; *H. crystallina* occurs not rarely in XI.; *H. fulva*, abundant in certain localities in II.; *H. excavata* occurs in II.; *Arion hortensis* is abundant in X., the blank districts of this widely-distributed slug almost certainly indicate simply that it has not been looked for; *A. intermedius* occurs in II. on Waterford side of river Suir; *Limax flavus* I found in my lodgings in X., a decidedly unpleasant fellow-lodger; *Amalia sowerbyi* is not uncommon in X.; *Helix pulchella* occurs in District X., as usually, in my experience, on sand-hills; *H. aculeata*, half a dozen specimens in Strabane Glen, X.; *H. lamellata* is abundant in one small glen in X., similar glens close by seemed destitute of it; *H. hortensis* occurs abundantly as a recent fossil in marl in District II, I have taken it alive in XI., which Dr. Scharff marks (?); *Buliminus obscurus*, I saw and examined one specimen of this taken in II., but entirely failed to procure specimens myself; *Balea perversa* is widely distributed in II.; *Succinea elegans* is, I think, quite as common as *S. pulvis* in II.; *Carychium minimum* occurs in X.; *Limnaea stagnalis* abounds in Co. Tipperary (II.) in certain small isolated ponds, it also occurs in River Suir; *L. auricularia* is found in one pond in Co. Tipperary (II.), it abounds (or used to) in the water-lily tank in Glasnevin Botanic Gardens; *Bythinia tentaculata* occurs in Killarney lower lake (I.); *Valvata cristata* in several running streams in II.; and *Pisidium amnicum* is common in River Suir (II.). From my own experience I have little doubt that close search would show that the distribution of Irish molluscs is by no means as local as the present state of these records would imply. For example, it is surely rather from lack of observation, than poverty in molluscs, that District III. makes so few appearances in these lists. I hope that a series of papers may appear ere long in *The Irish Naturalist* dealing with our marine mollusca. Such if written in a popular form would be a great boon to collectors who are unable to procure the expensive authorities on this subject.—A. H. DELAP, Fannett, Letterkenny.

AMPHIBIANS.

The Frog in Ireland.—With reference to Dr. Scharff's very interesting paper in the *Irish Naturalist* for January, he may be interested to know that the late Mr. Gage, of Rathlin Island, in answer to my enquiries, told me that the Frog had been introduced into Rathlin *several times*, but had always died out, although there are many bogs and swamps which would seem suited to it. Both spawn and adult frogs had been brought over from the mainland at different times, but neither succeeded. —ROBERT PATTERSON, Belfast.

An article on the Frog in Ireland by Mr. W. F. de V. Kane will appear in our next issue.

BIRDS.

Waxwings (*Ampelis garrulus*, L.) in Ulster. Two specimens of this rare winter visitor have been recently shot. Mr. D. C. Campbell of Londonderry writes us:—"on 31st January my neighbour, Mr. Ezekiel Bredin, slightly wounded and captured a bird which I found on examination to be a Waxwing in fine plumage. This is the first time I have met with the bird in this district."

Dr. A. M. D'Evelyn of Ballymena sends us, under date 6th January, a sketch and description of a second Waxwing, recently shot at Newferry, on the River Bann.

Autumnal Disappearance of Woodcock (*Scolopax rusticola*). Previous to the year 1889, I firmly believed that all our homebred Woodcocks deserted us in autumn, although it often struck me as being very strange that a certain locality should suit a bird, both as a breeding haunt, and also as a winter resort, and at the same time be found unsuitable in August and September. In that year I had discovered that I had never found Woodcocks during these months, simply because I had never taken sufficient pains in looking for them.

Within about four miles from the place where I live, there is a typical cock covert. It consists of a dense growth of birch, holly, stunted oak, etc.; one portion, having a southern aspect, slopes down to a narrow strip of bog, which separates it from the heather. Every year some birds breed in this wood. For the past three seasons I have visited it early in August, in order to find out how many clutches there were; I do this with the aid of my spaniel, and at the same time I calculate from the appearance of the young how soon they will be fit to shoot. I generally make my first bag about the middle of September. The old birds are not fit to shoot then, but it is very easy to distinguish between them, as the young are much brighter in colour. I sometimes, though rarely, do make a mistake on a snap-shot, and then what a wretched looking object my dog brings to my foot! I do not know any bird which, in moulting, casts its feathers as freely as a Woodcock; sometimes a bird will show a perfectly bare patch on the back. It is no wonder these birds, at this time of year, prefer to skulk in the thickest cover, and depend on their wit rather than their wings for safety; in fact, until their wing-feathers are grown, it is almost as hard to flush a Woodcock as a Water-rail. The young birds, observing their parents' tactics when menaced by danger, naturally act in a similar manner, and continue to do so until the withering of the Bracken renders concealment impossible.

In the covert to which I have alluded, an observer might tramp to and fro from morning till night any day in August, or early September, and, unless assisted by a good dog, he will probably go away under the impression that there was not a single Woodcock about the place. A steady close-beating cocker spaniel is the best dog to put up cock during these months; such a dog will not over-run a bird through excitement, nor lose time with a series of fruitless sets. When I first found our home-bred birds staying on till over-lapped by winter migrants, I mentioned the matter to a friend; he merely ridiculed the idea, and since

then I have permitted every man to hold his own belief. Now, however, that I have had three seasons' experience—and indeed I might say four—I would not consider myself justified in keeping silent any longer on the subject.—JAMES JOHNSTON, Novara, Bray.

Buff-Coloured Snipe (*Gallinago cœlestis*).—Mr. W. A. Hamilton, J.P., Ballyshannon, writes us that his brother shot near that town in December last, a buff variety of the Common Snipe. We notice in the current number of the *Annals of Scottish Natural History* a note on a similar specimen shot on the banks of the Tay, in October last.

A White Curlew (*Numenius arquatus*, L.) A specimen of the Common Curlew, nearly pure white, has been shot by Mr. R. Murray, of Ballyhaunis, Co. Mayo. The bird has been preserved and presented to the Dublin Museum.—*Land and Water*, Dec. 31st.

Bittern (*Botaurus stellaris*, L.) in Co. Clare. A fine example of the Bittern has been shot by Lieutenant-Colonel Oakes in the vicinity of Kilkee, Co. Clare. This is the first that has appeared this year in Ireland.—*Land and Water*, Dec. 31st.

Goosander (*Mergus merganser*) in Co. Cork. On December 22nd a male Goosander was shot near Timoleague; I have often heard of these birds being procured near the coast. Is their occurrence here rare? —G. E. DONOVAN, Timoleague, Co. Cork.

THE SHAMROCK—NOTICE.

Readers of *The Irish Naturalist* throughout Ireland are earnestly requested to forward to Mr. Colgan *rooted plants* of Shamrock to enable him to complete his inquiry into the species of the national badge (see paper in our volume for 1892). Each plant should be gathered in a rural district on or shortly before the 17th of this month by an Irish peasant, who can certify the specimen to be *real shamrock* proper to be worn on St. Patrick's Day. The specimens, labelled with their places of origin and accompanied by a statement that they have been duly certified, should be forwarded, packed in damp moss to

NATHANIEL COLGAN,
1 Belgrave-road,
Rathmines,
Dublin,

who has undertaken to cultivate the plants, and publish the results in these pages. It is hoped that this appeal may meet with a willing response from readers of this journal and their correspondents in all parts of the country, so that a complete and full collection of *real shamrocks* from every county on the mainland, and every island round the coast may be submitted to examination.

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A Journal of Malacology,

EDITED BY WALTER E. COLLINGE,

With the assistance in Special Departments of

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R. F. SCHARFF, PH.D., B.Sc., M.R.I.A.

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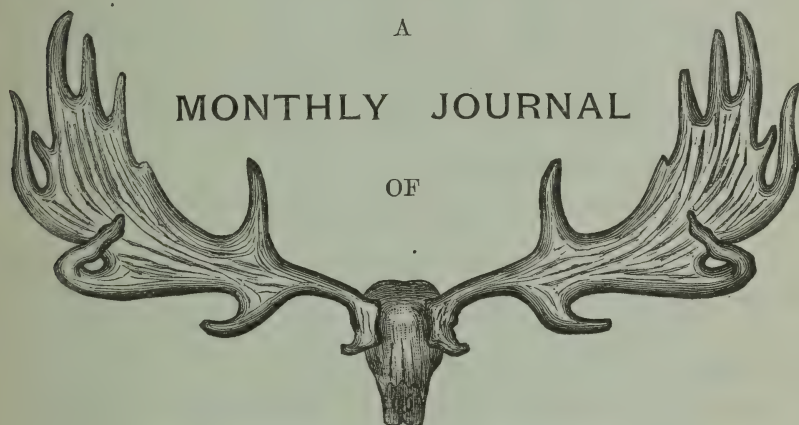
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The Irish Naturalist



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The Irish Naturalist.

VOL. II.

APRIL, 1893.

No. 4.

AMERICAN BIRD-VISITORS TO IRELAND AT HOME.

BY W. E. PRAEGER, OF KEOKUK, IOWA.

II. THE PURPLE MARTIN (*Progne subis*).

THE Purple Martin is one of those American birds whose occurrence in Ireland certainly cannot be attributed to escape from confinement; especially in 1840 (when a specimen was secured near Dublin), it was hardly likely that an attempt to transport such a purely insectivorous bird across the Atlantic could have been successful, as that was long before the days of ocean racers. That a bird of such great powers of flight and migratory habits should sometimes wander far from its native land is to be expected, and as this species is very abundant on the North American continent, it is not so surprising that wanderers should occasionally reach the western coasts of Europe.

The Martin spends the winter in Central and South America, none remaining in any part of the United States; but before the winter is well over, the northern movement has commenced, and they advance rapidly, long before the bulk of the insectivorous birds, and reach this latitude (Iowa) about the 1st April, and may occasionally have to endure snows or sharp frosts that not unfrequently occur at that time of year.

They do not seem to nest, however, till they have been with us some time, and I observed two pairs closely a few years ago which did not have eggs till the middle of June, but this was certainly unusually late. The Martins have now all forsaken their old nesting-places in holes in trees, or crevices in rocks, and take advantage of the houses that their friend man has provided for their comfort. The birds are such universal favourites that all over the country boxes are placed under the eaves or on some convenient tree or post for them to build in,

and the Martins often use the crevices about the eaves of the buildings themselves, and even make their homes among the factories and warehouses of the cities, where they may be heard twittering overhead, or seen gliding swiftly through the crowded business thoroughfares. No bird is more of a favourite with men, and even the Indians and Negroes in the south hollow out gourds and hang them on trees for the Martins to nest in, so that they may have them around their primitive homes.

The nest is rather a rough structure, built of straws and other rubbish, and lined with feathers. The eggs are four to six in number, pure glossy white; they are about the length of an English Swift's, but average a tenth of an inch more in breadth, and are much more glossy. During the nesting season the pair of birds keep close to their home, and the male assists the female; fights with the introduced English Sparrows are now common, and one of our worst charges against the strangers is that they drive away our beloved Martins. Individually the Martins seem more than a match for the Sparrows, but the latter are so numerous, so persistent, so cunning, and so unscrupulous in their methods of warfare, that in the long run the Martins have the worst of it. Sparrows will destroy the Martins' eggs if they are left unprotected, and it is not unusual for a number of the rascals to keep the parent birds engaged in a hot fight while others sneak in and destroy the nest and eggs. Is it any wonder that the governments of many of our cities, and even some of our States, have taken the matter up, and that in many places bounties are now offered for dead Sparrows?

In fair fight, few birds are a match for the Martin, and should a hawk, crow, or even eagle, come near the martin-house it will be instantly attacked, the smaller bird relying on its powers of flight for victory. Some farmers even say that the Martins are a protection to their poultry yards, giving warning as soon as a hawk comes in sight, and harassing the marauder should he approach too near.

The Purple Martin cannot be confused with any other swallow of Europe or North America. It might be said to be the least swallow-like of them all. It is quite large, seven and a-half inches long by fifteen and a-half in extent, of robust build, with strong feet and bill, the latter half an inch in length.

The wings are far from scythe-shaped, as usual in other swallows, and still more in the swifts, but have both edges rather straight, and approaching a triangle in shape. The bird nevertheless can match the best of them in speed, and graceful movements on the wing. Its food consists not only of flies and gnats, but also of bees, wasps, and beetles. Its note is a loud and varied twitter, almost amounting to a song. It is the only swallow of Ireland or the United States in which the two sexes differ decidedly in colour. The male is entirely a beautiful glossy purplish black, the female greyish brown, lighter or almost white on the breast, glossed with steel-blue on the back and head. Young birds are like the female, the young males being somewhat the darker, and soon showing traces of purple.

On the 17th October, 1887, when steaming down the Mississippi, near Burlington, I saw a flock of Martins, estimated at one hundred and fifty birds, in a dense cloud over the water, apparently feeding on a swarm of insects. The occurrence was remarkable, as I never saw so many Martins together before or since, and all Martins were supposed to have left this part of the country fully a month previously.

THE EARTHWORMS OF IRELAND.

BY REV. HILDERIC FRIEND, F.L.S.

(Continued from page 43).

WE are now to take the four groups into which the genus *Allolobophora* has been divided, and discuss the species which they respectively contain.

GROUP I. *Lumbricoidea*.

***Allolobophora longa*, Ude.**—LONG WORM. This species is the type of this section, and the only British representative at present known. Although it is even more ubiquitous than the common earthworm (*L. terrestris*, Linn.), and has been known to the angler for ages past as the Black-head, yet it was only recognised as a distinct species seven years ago, when Ude described it in the *Zeitschrift für Wissenschaftliche Zoologie* (1886, vol. xliii., p. 136), from specimens found in rich soil at Göttingen. It had never, I believe, been recognised as a British worm, till I found it three years ago around Carlisle, although it is so common that university professors and others have frequently used it as their type when giving lectures on biology! In more than one recent text-book it is apparent that the learned author had not the faintest idea that the Long Worm was different from the typical earthworm. It may be found in every part of Great Britain, and is as widely distributed in Ireland as in England.

The Long Worm is rightly so named. It is usually about six inches in length, but varies a good deal both in size and colour. I am making notes on these variations as opportunity permits, because of their important bearing on many points of interest. Taking the species as a whole, I have observed already four well-marked forms of variation.

First, there is the milky variety (var. *lactea*), which, I believe, is the same as Oerley's *Octoclasian lacteum*, found in Italy. It is found in clay or gravel, and is creamy white. Next comes a graceful, slight, and much-extended form found by shaking the soil of pasture land with a garden fork. A third variety presents a striking contrast to the foregoing. It is found in gardens and cultivated soil, and is coarse, rough, and thick-headed—altogether quite a clod-hopper type of animal compared with the pasture-lover. A further form has sunken male-pores, very dark head, girdle deeply coloured, and seems very like a hybrid. The position of the *tubercula pubertatis* in the pasture form suggests the possibility of its being a quite distinct variety, but the whole subject needs very careful study. There is something very characteristic about the shape of the prostomium when extended, exactly corresponding with a figure given some years ago by Lankester to a worm which he named *Lumbricus agricola*.

What may be regarded as the typical form of the Long Worm is marked by the following characteristics. The body is cylindrical, tapering in front and flattened behind. This flattened form of tail is indicative of the habits of the worm. It crawls forth at night and lies partly exposed on the soil, while the posterior extremity retains a grip of the burrow. In colour the worm is a deep sienna brown, not ruddy or brick-red, as the various species of *Lumbricus* are, though there is usually a small amount of iridescence present. The anterior portion is frequently so intensely dark as to suggest the angler's name of Black-head. The segments number from 150 to 200 in a full-grown specimen. The setæ are disposed, as in *Lumbricus*, in four couples, the individuals of which are nearly close together. The under-surface of segments 9, 10, 11, where the principal organs are located, is tumid and pale, while the male pores are readily observed on segment 15 situated on conspicuous pale papillæ. The lip can be greatly extended forwards, while posteriorly it cuts the first ring or peristomium only in part. In *Lumbricus*, it will be remembered, the lip completely bisects the first segment. (Fig. 8, p. 10). The first dorsal pore is found between the 12th and 13th segments. Ude was one of the first to draw attention to the value of this character, and it will be seen by the diagnoses which we shall supply, that there is usually a distinct relationship between the various members of the several groups in this respect.

The girdle of the Long Worm extends over the segments 28-35, three of which (32, 33, 34,) carry the so-called clitellar papillæ (*tubercula pubertatis*). I have observed in some varieties a divergence from this rule, but shall not at present puzzle the reader by the introduction of exceptions.

This worm is more liable than any other British species to "sport." I have received from different localities, and figured in *Science Gossip*, *Nature*, and elsewhere, several of these monstrosities. They usually take the form of a double head or bifurcate tail. As much is yet to be learned by the study of abnormal forms, I shall be gratified for any specimens which seem to be peculiar.

As I am constantly receiving fresh supplies of earth worms from Ireland—thanks to the industry of the readers of this journal—I shall have to give a special paper on the subject of distribution at the end of the series, when it will be possible to give a fuller and more accurate list of localities and collectors than at present. It may be stated, however, that up till the present I have received specimens of the long worm from the following localities:—

DISTRIBUTION IN IRELAND. Cashel, Co. Tipperary (Lieut.-Col. R. E. Kelsall); Blackrock, Co. Dublin (Miss E. J. Kelsall); Malahide (Mr. Trumbull); Glasnevin (Mr. J. R. Redding); Loughbrickland, Co. Down (Rev. H. W. Lett); Newcastle, Co. Down (Mr. Praeger); Cork (Miss A. N. Abbott); Carrablagh, Co. Donegal (Mr. H. C. Hart); Piperstown, Co. Louth (Miss S. Smith).

(TO BE CONTINUED.)

THE FLORA OF COUNTY ARMAGH.

BY R. LLOYD PRAEGER, B.E., M.R.I.A.

(Continued from p. 62)

ANNOTATED LIST OF RARER PLANTS.

- *Clematis vitalba**, Linn. N. — —
In hedges in several places about Armagh; W. F. J., and R. Ll. P.—an escape.
- (Thalictrum minus**, Linn., var. **montanum**, Wallr. — — S. ?
“*Thalictrum flavum*, or meadow rue, which I found on the lake side near the summit of Slieve Gullion, and on the river side near the village of Middletown.”—*Cooté's Armagh*. The Middletown plant is undoubtedly rightly placed under *T. flavum*, but if the S. Gullion plant was a *Thalictrum*, it must have been *T. montanum*. I searched the locality indicated without success; it is the little lough of Calliagh Berras, lying at an elevation of about 1,800 feet).
- T. flavum**, Linn. N. — —
On the river side near the village of Middletown, *Cooté's Armagh*. Frequent in meadows near the Blackwater (Campbell), *Flor. Hib.* Near entrance of Lagan canal at Lough Neagh (Hyndman), and shores of Lough Neagh near Maghery (G. R.); *Flor. Ulst.* By the Blackwater at Maghery, S. A. S. Mullinure meadows near Armagh, W. F. J.! Wet meadows by the railway south of Portadown, R. Ll. P.
- Anemone nemorosa**, Linn., var. Mr. More records (*N. H. R.*) a state of this plant, with the petals of a rich dark purple colour, in an open meadow at Loughgall.
- Ranunculus trichophyllus**, Chaix. N. — —
Crowhill, B. N. F. C., 1871, and Herb. N. H. P. S. spec.!
- R. heterophyllus**, Fries. N. — S.
In Lough Neagh at Ardmore point, and plentiful in Camlough river between the lake and the village, R. Ll. P.
- R. circinatus**, Sibth. N. — —
Entrance of Lagan canal; flax-hole on lake-shore near Ardmore glebe; in the greatest abundance in Lough Neagh at Derryadd bay, covering the water with a thick mat over a space of several acres, R. Ll. P. New to Ulster.
- R. penicillatus**, Dum. N. — S.
Lough Neagh at Maghery, S. A. S.! Callan river at several places near Loughgall, and abundant in stream at Forkhill, R. Ll. P.
- R. lingua**, Linn. N. — —
Lake side at Loughgall, More *N. H. R.*! Closet river, H. W. L.! Entrance of Lagan canal, R. Ll. P.
- *Aquilegia vulgaris**, Linn. N. — —
Lane at Killooney near Armagh, W. F. J. spec.! Frequent in hedges about Ardmore, H. W. L.
- Papaver argemone**, Linn. N. — —
Gravel-pit at Killaghy corner near Lurgan, and gravel-pit by the railway two and a-half miles N.E. of Armagh station, R. Ll. P.
- P. rhœas**, Linn. N. — [S.]
Armagh, abundant, S. A. S.! Cornfields near Armagh, W. F. J. spec.! Abundant on the limestone area lying between Armagh, Richhill, and Loughgall; not found anywhere else in the county, except as a casual on the railway at Wellington cutting south of Bessbrook, at Newry, and south of Portadown, R. Ll. P.

Papaver dubium, Linn.

N. — —

Sparingly, on roadsides, chiefly, near Portadown, Lurgan, Armagh, Loughgall, and Maghery. The only spots where more than an odd plant was found were the two gravel-pits where *P. argemone* grew. Not seen anywhere in the centre or south of the county.

†**Chelidonium majus**, Linn.

N. M. S.

Near Loughgall, More *N. H. R.*! Hedge-banks near Tynan, B. N. F. C., 1889. Navan Fort! and between Armagh and Loughgall! W. F. J. Seagoe, H. W. L. Tartaraghan, Lurgan, and Armagh, S. A. S. Roadside by Lough Ross near Crossmaglen, and old walls in Tanderagee upper demesne, R. Ll. P.

Fumaria pallidiflora, Jord.

N. M. S.

Rare. Noted from roadsides near Portadown, Armagh, Tartaraghan, Loughgilly, and Newry, R. Ll. P.

F. confusa, Jord.

N. — S.

Near Armagh and Newry—probably frequent, R. Ll. P.

F. muralis, Sond.

N. — S.?

Gravel-pit near Armagh (fide A. Bennett); near Newry (? A. Bennett), R. Ll. P.

F. densiflora, DC.

N. — —

Gravel-pit by the railway near Grange N.E. of Armagh, R. Ll. P. (fide A. Bennett). The only previously recorded Irish station is Portmarnock (Druce, *Journ. Bot.*, 1891).

Nasturtium palustre, DC.

N. M. S.

Maghery (G. R.), *Flor. Ulst.* (as *N. terrestre*); and subsequently, S. A. S., W. F. J., and R. Ll. P. Lurgan, S. A. S. Mullinure meadows near Armagh, W. F. J. Lough Gullion, bog south of Portadown, near Markethill, Mullaghmore lake, and Camlough, R. Ll. P.

N. amphibium, R. Br.

N. — —

Blackwater at Maghery, S. A. S.! Various places along Lough Neagh shore, such as mouth of Lagan canal, marsh south of Morrow's point, Bird Island, Closet river, and shore east of Maghery; also bog-drains south of Portadown, and in the canal south of Charlemont, R. Ll. P.

Barbarea vulgaris, R. Br., var. *arcuata*, Reich.

N. — —

Roadsides in several places near Loughgall, More *N. H. R.*! I found it by the roadside a little north and a little south of Loughgall; Mr. Bennett writes of my specimens "seems really Syme's plant;" Syme considered the Loughgall plant the only typical *arcuata* he had seen in Britain.

‡**B. intermedia**, Bor.

N. — —

Near Armagh, *Eng. Bot.* Abundant in some cultivated fields near Tartaraghan, More *N. H. R.* Not uncommon in the county, especially in the north, as at Lurgan, Portadown, and Armagh, R. Ll. P.

Sisymbrium thalianum, Gaud.

N. — —

Ardmore, H. W. L. North wall of Lurgan demesne, and luxuriant on railway ballast near to, and also three miles south of Portadown, R. Ll. P.

S. alliaria, Linn.

N. — —

Lurgan, S. A. S. Ardmore, H. W. L. Roadside north of Loughgall, and near Castlerow, which is N.E. of Loughgall; roadside at Maghery ferry, and at Derryadd bay on Lough Neagh, R. Ll. P.

‡**Diplotaxis muralis**, DC.

— — S.

On gravel ballast on main line of G. N. Railway at Wellington cutting, south of Newry, R. Ll. P. This rare plant, whose only known stations in Ireland are by the sea in the counties of Water-

ford and Dublin, grows in the present station along with *Spergularia rubra*, *Carum carui*, *Papaver rhæas*, and *Festuca rigida*. Its known occurrence in the Dublin district, and its association with *P. rhæas* and *F. rigida*, which are extremely rare in the north-east, but abundant in Co. Dublin, made me suspect that *Diplotaxis* might have been imported with the gravel from some station to the southward, and, an examination of the composition of the gravel having strengthened these suspicions, I applied to a friend of the engineering staff of the railway, who informed me that the material used on this portion of the line was brought partly from Goragghwood, partly from a pit south of Dundalk, and partly from Skerries, which is situated by the sea at the northern end of Co. Dublin. A visit to the last-mentioned place, which appeared the most likely, was kindly undertaken at my request by Dr. E. J. M'Weney, President Dublin Nat. Field Club, and Mr. David M'Ardle, of Glasnevin Botanic Gardens, with the result that *Diplotaxis* was duly discovered growing in the gravel-pit there, along with *F. rigida* and *P. rhæas*, thus extending the known range of the plant some ten miles to the northward; and there can be little doubt that the plant has spread to Co. Armagh from its Co. Dublin stations. But, at least, it may rank as a colonist, since the railway at Wellington cutting has not been re-ballasted for many years.

[**Draba incana**, Linn. N. — —

A single plant on the gravelled edge of an avenue in Loughgall Manor demesne, W. F. J. spec! It is difficult to understand how this rare plant can have come here, but it must have been by some chance. Its nearest station is Magilligan, Co. Derry].

D. verna, Linn. N. — —

One station only. Sheep-walk near Armagh (Admiral Jones), *Flor. Ulst.*; and recently, W. F. J. spec.!

Cochlearia officinalis, Linn. — — S.

Estuary of Newry river, common.

C. danica, Linn. — — S.

With the last.

Thlaspi arvense, Linn. N. — —

Cultivated ground at Loughgall, More *N. H. R.* Roadside between Portadown and Tartaraghan church, R. L. P.

***Lepidium draba**, Linn. — — S.

In some abundance on waste ground below Newry docks, no doubt accidentally imported, R. L. P.

L. campestre, R. Br. N. — —

Among crops at Tartaraghan, and in a cultivated field near Loughgall (var. *longistylum*), More *N. H. R.* Mr. More writes me that he does not consider the latter form of any importance as a variety. Co. Armagh (G. R.), *Flor. Ulst.* Roadside near Lurgan (S. A. S.), Herb. N. H. P. S., spec. ! Tannaghmore near Lurgan, R. L. P.

L. smithii, Hook. — M. S.

The distribution of this species is the reverse of the preceding. It is absent on the trap, limestone, etc., of the Northern district, but of frequent occurrence throughout the Silurian and granite areas.

(**Subularia aquatica**, Linn. (N.) — (S.))

Said to have been found in Lough Neagh by Sherard, *Flor. Hib.* In Lough Neagh, Co. Armagh (D. M.), *Cyb. Hib.* In the canal at Newry (Thompson), *Flor. Ulst.* Not found in Lough Neagh since the lake was lowered by drainage in 1855, but it is improbable that a plant which appears to have been abundant there has been exterminated by this cause. The water in the canal at Newry is nowa-

days so impure that I was not surprised at my failure to re-discover it at that station).

†*Viola odorata*, Linn.

N. — —

Co. Armagh (G. R.), *Flor. Ulst.* Grange! Loughgall! Tyross Hill, Tynan, W. F. J. Near Loughnashade, R. Ll. P. Doubtfully native in this county.

V. canina, Linn.

N. — S.

Banks of Lough Neagh, More *N. H. R.*! Maghery, S. A. S.! Common along the Lough Neagh shore; on shores of Lough Ross, near Crossmaglen, R. Ll. P.

Drosera intermedia, Hayne.

N. — —

Moynagh bogs (Hyndman), *Flor. Ulst.* Abundant on the extensive bogs south of Annagarriff lake, where it almost entirely replaces *D. anglica*, R. Ll. P.

D. anglica, Hudson.

N. — —

Moynagh bog (Hyndman), and bog at Annaghmore (G. R.), *Flor. Ulst.* Bog near Maghery, W. F. J. spec.! Montiagh bogs, H. W. L. spec.! Annaghmore, S. A. S. In many places, and often abundant, on the bogs which lie along the Lough Neagh shore between the Blackwater and Ardmore point, and sparingly on a bog south of Portadown, R. Ll. P. Not seen on the southern mountains.

(*Elatine hydrophilæ*, Linn.

— — (S.)

In the canal at Newry (Thompson), *Flor. Ulst.* Not found there since, and probably not there now. The Lagan canal records of *Flor. Ulst.* and *Cyb. Hib.* are just outside our district).

**Saponaria officinalis*, Linn.

N. — S.

Montiagh and Derryadd, H. W. L. spec.! Railway embankment near Tartaraghan glebe, and by the railway at Dublin bridge, Newry, R. Ll. P.

Silene noctiflora, Linn.

N. — —

In a gravel pit near the railway $2\frac{1}{2}$ miles N. E. of Armagh station, R. Ll. P.

Lynchnis diurna, Sibth.

N. M. —

Shore of Lough Neagh at Maghery, W. F. J. spec.! Raughlan, H. W. L. spec.! Banks of Closet river, and in Tanderagee upper demesne, R. Ll. P.

Sagina maritima, Don.

— — S.

At the canal locks below Newry, and abundant on marshy ground near Newry docks, R. Ll. P.

S. nodosa, E. Meyer,

N. — —

Near Navan Fort, W. F. J. spec.! Shore of Lough Neagh near Ardmore, H. W. L. spec.! Lowry's Lough, bog of Annaghmore, Lough Neagh shore near Reedy Island, and by a lakelet east of Middletown, R. Ll. P.

Arenaria trinervis, Linn.

N. — S.

Hedges about Loughgall, More *N. H. R.* Tynan, S. A. S. Hedgebank near Lagan canal, old fort at Crowhill, and abundant under trees at Bessbrook viaduct, R. Ll. P.

A. serpyllifolia, Linn.

N. — S.

Legarhill near Armagh, W. F. J. spec.! On the railway two miles south of Portadown, and frequent about Newry, R. Ll. P.

A. leptoclados, Guss.

N. — —

Old limestone quarry near Grange N.E. of Armagh, and in a gravel-pit near mouth of Lagan canal, R. Ll. P. Mr. More writes me that he does not consider *A. leptoclados* specifically distinct from *A. serpyllifolia*, but only a slight variety, and that he has found intermediate forms. In Armagh both species occur in various situations, and they appear to me distinct.

Cerastium tetrandrum, Curtis.

— — S.

On the G. N. Railway at Wellington cutting, R. Ll. P.

Spargularia rubra, Pers.

N. — S.

On the G. N. railway a mile south of Portadown, and at Wellington cutting near Newry, and abundant on the Greenore Railway near Narrow-water. Found, strangely enough, on railway ballast only, but the plant is certainly a native in the county, and not imported, since the Narrow-water and Portadown ballast at least is local material; the plant does not grow in the gravel-pit at Skerries, where the Wellington cutting ballast was presumably obtained.

S. media, Pers.

— — S.

Estuary of Newry river, abundant.

Malva moschata, Linn.

N. M. S.

Tanderagee (Templeton), *Flor. Ulst.*! Fields on Lough Neagh shore at Derryadd and Raughlan, H. W. L. spec.! Roadside near Lurgan (S. A. S.), Herb. N. H. P. S.! Hedge-bank a mile north of Newry, and in the upper and lower demesnes of Tanderagee, R. Ll. P.

(TO BE CONTINUED).

IS THE FROG A NATIVE OF IRELAND?

BY W. F. DE V. KANE, M.A., F.E.S.

DR. SCHARFF'S paper on the origin of this ubiquitous batrachian in Ireland seems to imply that an undoubted naturalization of some 200 years in this country does not confer the title of "native." But, joking apart, I would wish to examine the interesting problems suggested, and, no doubt, Dr. Scharff's remarks are more in the nature of a challenge for discussion than an attempt to press the interesting evidence he has collected in disproof of the tradition generally accepted against its indigenous origin, which tradition I, as an undoubted native, maintain. Now, with respect to the introduction of a colony of frogs before the year 1700 into the grounds then lying about Trinity College, Dublin, there is a collection of MSS. preserved in the College Library, formed by Dr. Thomas Molyneux, a portion of which was utilized in the volume published in 1755, entitled "A Natural History of Ireland, by Dr. Gerard Boate, Thomas Molyneux, M.D., F.R.S., and others." From one of these MSS. it would appear that, previous to the year 1700, there was projected a more comprehensive scheme than the meagre result above mentioned, and I find that to Dr. Gwither was assigned the collection of information as to Irish quadrupeds, to the Provost and Dr.

Foley as to fishes, to the Lord Archbishop of Dublin and Sir R. Bulkeley as to insects; while Dr. Scrogs and Mr. Cox took in hand the botanical, and Dr. Molyneux the mineralogical sections.

In another paper we have short memoranda as to birds, by which it appears that the "cock of ye wood, *Urogallus major*," and "ye great Irish owle," were found then in Ireland and not in England; while the "magpye" was rare in Ireland and common in England; as also "ye comon black crow cornix, quære whether it be found at all in Ireland?" is a noticeable entry. But to come to the Frog. Under "Quadrupeds in England and not in Ireland" are noted "Frogg, toad, mole, water rat (vole), and roe in Scotland." From this we learn that Dr. Gwithers was not able to learn of the existence of the Frog at that time in Ireland, and certainly thought he was introducing a new animal. It is also well known from contemporary notices that after twenty-five years the colony spread rapidly far and wide. But if we are to accept Dr. Scharff's proposition, we must conclude that since 1700 the Frog has extended itself from Achill to Dublin, rather than *vice versa*. Now, if we examine the evidence brought forward in favour of its being indigenous, we find Stuart quoting Colgan to the effect that one specimen was first noticed in a pasture field near Waterford about 1630, and that Giraldus Cambrensis records in 1187 another, also in a locality near Waterford. We also have to note that in both cases they were viewed with unfeigned surprise by the inhabitants of the country. Now, if I might be allowed to conjecture that Giraldus's green Frog was the indigenous Natterjack, which, from its colour and more slender proportions, differs greatly from the Common Toad, and might well be taken for an Irish Frog, we should at once have a solution of the mystery; as the retiring habits of the former animal, its peculiar localisation, and its failure to propagate its species in such numbers as to spread widely either here or in England, would quite account for its not having been historically recorded since 1630. I think, too, the remarks of Giraldus are very convincing, when, attempting to prove his remarkable aerial germ theory, or the bacterial embryology of his specimen, he points out most cogently that if it had had been engendered by Irish mud "they would have been found more frequently and in greater

numbers, both before and after the time mentioned." So it is evident that, after this single apparition, the land did not bring forth frogs abundantly, owing, Dr. Scharff suggests, to the ducks, an explanation which did not suggest itself to Giraldus. Nor does the frog sculptured on the Drumcree cross, as Dr. Scharff freely acknowledges, prove much. For, on the same most interesting but much weather-worn relic there is the representation of a camel (so most archæologists hold, though others have declared it "very like a whale"), but no one would thence infer that the camel was indigenous to Ireland.

To me the two real cruxes propounded in the interesting paper I am discussing seem to be the following:—Firstly, the presence of the bones of a frog in the deposits of the Ballynamindra caves. Now, if it be beyond question that the stratum in which these were found was extremely ancient, and not a surface deposit, it would be very convincing, but would it be possible to ascertain whether the remains might not be that of our undoubtedly indigenous Natterjack? The second difficulty put forward is the present wide distribution of *Rana temporaria*, which occurs more abundantly, we are assured, in the west than in the east of Ireland; while its introduction has been alleged to have taken place not more than 200 years ago. Now, as to its greater abundance in the marshes and mountains of the west, this is only to be expected, once it became naturalised there. It could not well be more numerous, however, in the fens of Wicklow than it is, and in such ponds and streams as exist in the county of Dublin. And when we consider that about twenty-five miles up the stream of the Liffey we reach the confines of the Bog of Allen, which extends almost continuously to the placid floods of the Shannon, and the series of lakes and lakelets of its upper reaches which drain the extensive bogs of Leitrim, Longford, and Roscommon, I do not think that it would be at all surprising if the spawn of so prolific an animal placed on the banks of the Liffey in the then marshy recreation fields of Trinity College, outside of Dublin, should find its way to Achill in, say, 100 years. For the aquatic birds which Dr. Scharff arrays on his side of the question to keep the batrachian hosts in check do undoubtedly aid in its distribution by carrying the spawn from marsh to marsh, and so probably to Achill. While

conceding their probably larger numbers in former times, we must, at the same time, remember that the dripping forests and woodlands which, so late as Spenser's time, *i.e.*, about 1600, and later, as may be seen from maps, covered vast tracts of Ireland, would shelter the slimy victim from his winged foe, and aid his secure peregrinations.

So, if it is not an indigenous animal it had everything in favour of its rapid multiplication. Further, we may take into account the well ascertained and acknowledged phenomenon of the extraordinarily rapid multiplication of newly-introduced creatures in a suitable habitat.

In explanation of the difficulty which militates against Dr. Scharff's contention, arising out of the modern character of the Gaelic name for the Frog, he suggests that some more general term might have been used for an obscure animal which was not of use to man, etc. But I believe it is a remarkable fact, and has been frequently commented upon, that the Irish vocabulary is surprisingly rich in special and significant names of every sort of natural object; and that a considerable number of birds and plants were well recognised by specific names at a very early date in Ireland, so much so as to challenge the surprise of investigators, more than one of whom have pointed out that, notwithstanding the rude conditions of their existence, the Irish showed a keen perception of natural phenomena, and seized upon the characteristic features of any natural object with peculiar quickness. The very fact that any animal like a Frog was, as Dr. Scharff points out, looked upon as uncanny, even if not poisonous, would have rivetted attention to it, and secured it a place in the vocabulary if at all known. The caterpillars of Sphinx moths were noted, named, and a mass of fables were invented for them, as well as for the Newt or "Delicaluchre," as it is called. The "Dordeil" or uncanny-looking beetle *Ocypus olens* was also well known, sadly slandered, and cruelly ill-treated. I will not multiply instances, but end by asking whether there is any instance known of the common Frog inhabiting any country so suitable for its habitat and multiplication as Ireland, and being able nevertheless for centuries to exist in such small numbers, or under such circumstances as to escape the notice of intelligent inhabitants?

WATER SPIDERS IN CAPTIVITY.

BY REV. W. F. JOHNSON, M.A., F.E.S.

ON September 5th, 1892, a kind friend drove me down to Clonmacate, on the shores of Lough Neagh. Having arrived, I made for the shore of the lake, where, on a former visit, I had had some success in capturing Coleoptera. I soon came to a very promising looking drain covered with *Potamogeton*, etc. I went my water-net, and when I drew it forth I gave a howl of delight (there was no one near but two young lady friends who were watching my operations with great interest, so my antics did not matter), for here were two *Argyroneta aquatica*. I should, perhaps, explain that *Argyroneta aquatica* is an interesting and somewhat rare spider. It lives under water, thus differing in its habits from other spiders, and usually hides itself in the recesses of deep drains, only coming to the surface occasionally for air, and is, consequently, not easy to catch. This will explain my excitement on the present occasion. Having duly exhibited them, I secured them in boxes, such as one usually uses for Lepidoptera. I had forgotten my spider-tubes, so I had to put up with a substitute. I went the net again, and out came more *Argyroneta*, and with every plunge of the net there were more; in fact, I could have taken thirty or forty if I had so wished. Evidently I had come upon a regular rendezvous, the head-quarters of these spiders in that locality. I tried just skimming with the net, only a couple of inches below the surface, and took the spiders that way as well as when I plunged deep down into the drain. I secured as many as I thought would suffice Mr. G. H. Carpenter, and a couple for myself, and let the rest return to the maxillæ of their family. When I got home, I duly introduced those intended for Mr. Carpenter to a phial of spirits, and finding that two which I had put into one box had travelled without quarrelling and eating each other, I placed them in my aquarium, in hopes that they might condescend to live a little time therein, and give me an opportunity of studying their habits. I felt rather doubtful about this, for I had tried the same experiment with one caught in the Mullinures, but it had incontinently died. However, to my delight, the

present pair seemed to have no intention of dying, and soon established themselves in the rock-work of the aquarium, and I had the pleasure of seeing each with a silvery web full of air. I was very curious about this web full of air, for I had been told that there were various theories as to the way in which it was filled, consequently I was much delighted one day at seeing the process. I noticed the smaller of the two spiders going backwards and forwards from a point below to the surface. Looking closer, I saw that it had spun a web, and was occupied in filling it with air. It would run up to the surface, fill its air sac, and run down to its web and empty its cargo of air, and immediately return for more, until the web was fully distended. For some days the two spiders kept their respective quarters, but one morning the smaller had disappeared, and I came to the conclusion that the larger spider had yielded to the worst instincts of its nature, and devoured its companion. I was consequently much surprised and pleased a few days ago, to see the small spider again, after losing sight of it for fully two months. The large spider had left its usual haunt, and the small one was coolly sitting there. It has since disappeared again, so I conclude it ensconces itself in some hole or corner where its bigger brother cannot intrude.

I was somewhat puzzled at first to understand what use the spiders made of the bags of air which they accumulated, but careful observation revealed the secret. The spider weaves its air-bag in some suitable position, and then sits with the opening of its own air sac in the woven bag of air, and is thus able to remain under the surface for a long time, and pounce upon any unwary denizen of the waters that comes within its reach. When the air in the web is exhausted, the spider does not seem to use the same web again, but to make a new one. Owing to this habit, the hole in which the big spider lives has got quite full of discarded webs. These, of course, are useful for entangling passing insects. Most of the time the spider sits motionless in its web like its congeners who live above water. I was much amused the other day at the big spider. I was poking about with my pincers, and put them near it, when immediately it made at them in most fierce fashion, and followed them out of its lair up to the surface. It then retreated, but on my putting the pincers down again, it

again rushed out to the attack. I have not yet seen either spider in the act of capturing any prey, but as the number of water-beetles in the aquarium steadily decreases until renewed, and the spiders are plump and lively, I conclude that *Hydroporus palustris* and Co. furnish the arachnid dinner-table with sumptuous repasts. I found one cast skin, but of which spider I could not tell, probably the larger one.

As far as I can judge, the spiders are most active at night, and they choose for their residence the darkest corners of the aquarium. As the spiders are very well, I am in hopes that they will live for some time longer, and possibly enable me to add some further observations to the present notes.

Since writing the above (in December last), I have made some further observations

When travelling over the bottom, or on the rock-work, they move like other spiders, but when swimming they turn on their backs, and paddle with their legs, the hairs on which must assist this process. They look very funny when thus swimming, as they appear to be making vast exertions to walk upon nothing. They are able to remain below the surface, without renewing their stock of air, for a considerable time. I timed the smaller spider one day, and it was forty-five minutes without renewing its stock of air. During the most of this time it was running about on the bottom of the aquarium. This, coupled with their habit of remaining motionless in one spot for an hour or more, would account for the difficulty usually found in meeting with them. On 22nd December, the big spider was very busy with a new web, which it was filling with air. To introduce the air from its sac into the web, it applied the apex of its abdomen to the opening in the lower part of the web, and pressed the air backwards with its two hindmost legs so as to pass it into the web. It spent from 7 p.m. till 7.30 in this occupation, and then after a great rubbing of its legs against each other, got into the web, and sat there evidently in a great state of contentment. I have discovered the abode of the smaller spider. It is in a hole in one of the stones, from whence it is very difficult to dislodge it. It seems probable from what Mr. Carpenter tells me, that the large spider is a male, and the small one a female. This will, of course, account for their amiability, and as they are at the present time (March) still well, I may have an opportunity of seeing them rear a family.

THE SILICIFIED WOOD OF LOUGH NEAGH.

BY WILLIAM SWANSTON, F.G.S.

(Concluded from page 66.)

DR. MACLOSKIE, in 1873, gave an elaborate paper to the Belfast Natural History and Philosophical Society on the silicified wood, and expressed his opinion that the specimens found in the drift were derived from beds of Miocene age, and gave a fancy picture of a vast river flowing southward over a continent of which the Hebrides and Western Islands of Scotland form but a remnant, and this river brought the partially silicified wood, and scattered it along its course.

In the same year, 1873, the coal question was the all-absorbing topic, and Mr. Wm. Gray, M.R.I.A., then Senior Honorary Secretary of the Belfast Naturalists' Field Club, gave a valuable paper on "The Lignites of Antrim and their relation to true Cal." The subject was thoroughly gone into, and many new facts were brought forward; perhaps one of the most important being the discovery of silicified wood in the basalt at Laurencetown, where, he states:—

"There is a bed of lignite in the basalt about thirty feet from the surface, and in this lignite there are layers of wood charged with siliceous matter, and resembling the wood erroneously supposed to be petrified by the waters of Lough Neagh. This fact supplies the evidence Captain Portlock admitted was wanting."

After summing up all the evidence, which Mr. Gray puts into a concise form, he comes to the conclusion that we cannot escape the deduction that the beds of Ballypalady, Isle of Mull, those near Shane's Castle, and at Laurencetown, together with the silicified wood, and their associated lignites of Lough Neagh, are of the same age,—namely, Miocene, as supposed by various writers.

Taking the literature of the subject in its order, the next reference we have to these Lough Neagh beds is that made by the officers of the Geological Survey, and as their opinions are of great weight, it is necessary to examine them carefully. Sheet 47 and its explanatory memoir, describing the neighbourhood of Armagh, was issued in 1873. Sheet 35 and its explanation, descriptive of the Tyrone Coal-fields, and the south-

west corner of Lough Neagh, appeared in 1877; these clay beds are there described fully, under the head of *Pliocene Clays*, their thickness being estimated at above 500 feet. The results of many borings and sections obtained in pits are given. Nearly all of these have records of lignites and ironstone nodules, the latter in one place containing reed-like plants. The writers are careful however to note that "in no instance has any specimens of the celebrated silicified wood of Lough Neagh been found in them, although a good opportunity for its discovery has thus been afforded over an extensive area."

The memoirs and sheet 27 appeared in 1881, and there is again another chapter on the Pliocene clays continued into the area which they represent. The author says—"That the fossil wood is more or less directly connected with the lignite seems to be generally admitted, but there has existed diversity of opinion as to the nature of this relation;" and he then proceeds to give one of Dr. Barton's definite statements, and quotes the paragraph describing his digging into the lignite deposit where some of his largest specimens were found, and concludes with the following paragraph:—"Mr. Hardman, one of the surveyors, supposes that the silicified pieces of wood had their *locus* in the basalt, and that the silicification is due to the percolation of water through the porous and easily decomposable rock. That this process does take place, at least to some extent, appears from a note to Dr. Macloskie's paper, referring to a specimen of partially silicified lignite found intercalated between beds of trap at Knocknagor, near Banbridge; and specimens are said to have been found in the heart of silicified blocks at Lough Neagh, resembling lignite of Knocknagor and the Giants' Causeway." Thus to a great extent, all the definite statements based on the observations and research of previous writers, that the silicified wood has its source in these clays, are ignored.

In company with Mr. Starkie Gardner, the writer visited the Lough shores frequently in the summer of 1884, when the waters were low, and while admitting the probability of silicified wood being found in the basalts, we were quite satisfied from what we saw, that the Lough Neagh examples and the numerous specimens scattered about that area are associated with the ironstone nodules, and are derived from

the lignite-bearing clays in question, but no positive proof could then be gained, and the older writers stood unsupported. In December 1884, however, Mr. S. A. Stewart, of Belfast, and the writer again visited the ground, and found that a pit had been sunk on the margin of the lough at the spot so precisely indicated by Dr. Barton, that is to say Ahaness, half a mile south of Glenavy river. The pit had been sunk to obtain lignite for trial in some manufacturing process. We found the hole, about three feet deep, full of water, but after no small labour we cleared it. Under a foot of surface gravels, and some of the white tenacious clay which characterises these beds, was a solid stratum of lignite, that is, vegetable matter such as branches and roots of trees, twigs, and earthy matter, probably leaves, etc., much decomposed and all greatly compressed, and of a black or dark-brown colour. With a good deal of difficulty it could be dug, as so accurately described by Dr. Barton. We could not work long at the digging, as the water could not be kept out, but after throwing out several hundredweight had to abandon the work. On asking the very intelligent farmer who assisted us if he could tell us where the silicified wood came from, he at once said it came from the lignite, and could prove it. He said he had carted several loads of the lignite to his house for fuel, and on burning a large woody piece he found the heart of it was stone. The calcined remains of this important specimen he gave the writer, and pointed out the heap he had carted up, and in it was then found a piece, part wood and part stone, that had not reached the domestic hearth. Resident for a long time on the spot, he said there could be no doubt but the specimens found along the lough side had originally come from the lignite beds. Several pieces on his garden wall showed part still wood, although they had been there exposed for years.

All this is, after all, only corroborating what has already been described by Dr. Barton, and re-asserted by Dr. Scouler, our wish being to place it again on record, believing it to be the proof necessary to show the relation between the fossil wood and the lignites, as required by the writer of "Explanatory Memoir to Sheet 27" of the Geological Survey.

Having thus pointed out the source of what for accuracy may be termed the Lough Neagh wood, and at the same time admitting the occurrence of examples from the basalt, it is

necessary to endeavour to define the position or geological age of the beds to which they belong.

The officers of the Geological Survey¹ have assigned them to Pliocene age, evidently from stratigraphical evidence only. In 1883 and 1884 Mr. J. Starkie Gardner, F.L.S., F.G.S. paid several extended visits to Belfast in furtherance of his researches in Tertiary floras. The writer had the advantage of accompanying him to the best fossil localities. On the visits to Lough Neagh large collections of the silicified wood and the ironstone nodules associated with it were made; many of these nodules were exceedingly rich in plant remains, in beautiful preservation, and they afford a key not previously examined, to the age of the beds. The plant-bearing beds interstratified with the basalts also received close attention, Ballintoy, Ballypalady, and Glenarm yielding a vast store of fossil evidence. To be brief, the results of Mr. Gardner's examinations of these, in the light of experience gained by working in all the English Tertiary deposits, as well as many on the continent, in Scotland, Iceland, and Madeira, will perhaps be best summed up by an extract from a paper which he read :—

“The plants which these nodules contain are most diversified, though usually small-leaved dicotyledons, which at first sight seem of very modern aspect. On closer examination, however, many are found to be characteristic of English Middle Eocene, and others of Lower Eocene. Others are common to Ballypalady, to Mull, and to Greenland. This mixture of types so separated elsewhere would be difficult of explanation did the thickness of the deposit not warrant the belief that it may have been continuously forming throughout more than one period of the Eocene. Most of the plant-remains come probably from the higher horizons now exposed on the shores of the lough; but some of them from the Boulder clay may come from much lower zones in it. The flora, however, is by far the most important link yet discovered between the Eocenes of England and those of high northern latitudes, and as such is deserving of most attentive study.²

To summarise, the Lough Neagh silicified wood (as distinguished from the few examples found in the basalt, which bear but little outward resemblance to it) is found in the lig-

¹ Memoirs of the Geological Survey; Explanatory Memoir to sheet 35, page 72.

² The Lower Eocene plant beds of the basaltic formation of Ulster, by J. Starkie Gardner, Esq., F.L.S., F.G.S.—Q.J.G.S., February, 1885.

nite beds of the clays, associated with ironstone nodules containing a rich assemblage of plant-remains, which point to a Middle or Lower Eocene age for the containing deposits. As all the fossil evidence obtained from the plant-bearing beds intercalated with the basalts of Antrim also points to the same horizon, some of the fossils being common to both, we cannot escape the conclusion that the basalts are of the same age, which is one much earlier than that previously assigned them ; and they thus rank with the famous deposits of Mull and Greenland, and form perhaps part of the remains of the same stupendous volcanic outbursts. During the intervals in these outbursts, dense vegetation flourished, lakes and mountain tarns received deposits of detritus and vegetable matter from highlands, the position of which we cannot now even conjecture. Succeeding lava-outbursts overwhelmed most of these lakes, and their sediments were by heat and pressure converted into what are now the plant-bearing iron-ores of Antrim. The lignite beds of Lough Neagh, lying just outside the south-western fringe of these immense lava sheets, escaped the fate which overwhelmed the more northern deposits, and thus they still retain their unaltered plastic character. Infiltration of silicious waters, such as often accompany volcanic activity, reached some of the buried wood, altering its woody structure and forming the silicified wood of Lough Neagh. Students of geology in this age of enquiry would probably never have known of the existence of this interesting fossil, had not the ice of a Glacial Epoch cut deeply into the deposits, scattering their contents far and wide to delight and puzzle them.

NOTES ON THE FLORA OF THE ARAN ISLANDS.

BY NATHANIEL COLGAN.

(*Concluded from page 78*).

THE third day's work in Aranmore was the most successful of all. Traversing the island from Kilronan to Bungowla, in the extreme west, and returning by the shore through Port Cowruck and Monastir, I noted the range of the Aran form *vincale* of *Helianthemum canum*, found three additional

stations for *Astragalus hypoglottis* in the neighbourhood of Kilmurvy, added to the flora of the islands one sedge, *Carex præcox*, abundant in a very dwarf form near Bungowla, found in Oorgowla lake the *Hippuris vulgaris* and *Myriophyllum*¹ of Mr. Hart, which Messrs. Nowers and Wells had failed to trace, and, as a crowning piece of good fortune, discovered a solitary plant of the long-desiderated *Ajuga pyramidalis* in a shady nook of rock close by the hamlet of Creggacareen.² The *Helianthemum* occurred, at intervals, from near Oghil on to Bungowla, over a stretch of about five miles, profusely in many places, and appears confined to that northern strip of the island lying between the high road and the sea, so that its upper limit here must be placed at a height of not more than 180 feet. In Lough Oorgowla I found *Ranunculus trichophyllus*, first reported from the islands by Dr. Wright, and on the way back to Kilronan observed several plants of *Thalictrum minus*, and a few of *Hieracium anglicum* on a rocky tract, strewn with granite and conglomerate erratics, close by the shore between Kilmurvy and Port Cowruck.³ This station seems to be distinct from those recorded for these species by Mr. Hart. Near Port Cowruck *Chrysosplenium oppositifolium* was found, at Monastir Kieran the Male Fern, and at Creggacareen *Oxalis acetosella*. These three species, which seem to be among the rarest in the islands, were first added to the flora of the group by Messrs. Nowers and Wells from other stations in Aranmore.

A swift run of less than three-quarters of an hour in a large native *curragh*, or canvas canoe, manned by three islanders, took me next morning across the four miles from Kilronan to Inishmaan, or Middle Island, where I landed for a couple of hours before pushing on to Inisheer, or South Island, four miles farther to the south-east. Inishmaan seems to remain

¹ The plant was not sufficiently developed to admit of the species being determined.

² See note in *Journal of Botany*, of Oct., 1892, for details of this re-discovery.

³ On the shores of this small creek opening N. W., great quantities of the *Laminaria* weed, the "Cowlyock" of the islanders, and of the western Irish in general, are thrown up by western gales, and kelp-burning is in consequence very actively carried on here. The *Slawth vauvé*, or sea-rods, as the *Laminaria* stems are called, are highly esteemed for kelp-making, so long as their rind remains unbroken.

to-day what Mr. Hart found it in 1869, the most primitive of the three islands, and the visit of a stranger is still regarded as an event. As I strolled up from the landing-place towards the fine old cyclopean fort in the centre of the island, peering into the fissures of the limestone, and pausing now and again to jot down the species observed, I soon found that I was not the only one engaged in taking notes. I had only to raise my head sharply to set other heads ducking behind stone walls, or to catch glimpses of red petticoats flashing into ambush round the corner of some boreen. The net result of the two hours spent in Inishmaan was the addition of three species to the flora of the islands, *Erophila verna* from the old fort, *Pyrus malus* from the track to Ballintemple, one tortured shrub spread flat like a juniper over the limestone, and *Ranunculus baudotii* from shallow rock-pools north of Ballinlisheen. Maiden-Hair was rather frequent in the north-west of the island, and *Ceterach officinarum* less rare than in Aranmore and Inisheer. No trace of *Helianthemum canum* or *Astragalus hypoglottis* was observed either here or in Inisheer, though the latter was found in Inishmaan by Mr. Ball in 1835. As no botanist, of the many who have visited the islands, has reported the *Helianthemum* from Middle or South Island, it may fairly be set down as confined to Aranmore.

We landed at Inisheer soon after two o'clock, and here I secured very comfortable rooms in the house of Mr. Michael Costello, a retired constabulary sergeant, who takes an intelligent interest in his native Irish tongue. Two days were very pleasantly spent in exploring Inisheer, without, however, making any additions to the flora of the islands. Most of the prevalent limestone species of Aranmore were equally abundant in Inisheer. *Gentiana verna*, now almost past flowering (May 28th), occurred frequently, as in the other two islands, though apparently nowhere so abundant as on the limestone drift of Gentian Hill, and the promontory on the opposite shore of Galway bay, where it grows so freely down to sea-level, associated with another alpine species, *Dryas octopetala*. These curious isolated masses of drift, with their distinctly alpine flora, resemble nothing so much as slices of dead *moraine*, slid down bodily from some snowy range, carrying with them their freight of alpine plants.

Maiden-Hair in some parts of Inisheer is abundant and

luxuriant, the individual pinnules of some old fronds which I plucked measuring fully one three-eighth inches in their largest diameter. This fern is rather capriciously distributed over the island, and it seemed to me as if the absence or presence of the species depended largely on the direction of the limestone fissures with relation to the prevailing winds, though on this point my observations were not numerous enough to enable me to speak with confidence. *Arabis hirsuta* was plentiful in many parts of the island, and curious pads of *Carex pulicaris* were found here and there filling up hemispherical basins in the limestone, where, like sponges, they hold the rain water with sufficient tenacity to carry the species alive through the droughts of summer. A single plant of Juniper was known to grow in the island when I arrived there, and my discovery of a second plant, near the light-house in the south, gave deep satisfaction to the Inisheer boy who accompanied me in my rambles.

For the first-known Juniper had almost succumbed under the severe strain of recurring Palm Sundays, when it has been forced to furnish the island population of some sixty families with their emblematic palm. Throughout Ireland, as is well known, the Yew does duty for the eastern palm on such occasions; but the tree is nowhere found in the islands at present, though clear evidence of its former existence in Aranmore is afforded by the place-name, Oghil.

The boy, Peter Donohoe, who assisted at the discovery of this second Juniper, was well versed in Irish plant-lore, and I was able to get from him an Irish name for *Sedum anglicum*, a species I had never previously heard named in the native tongue. This stone-crop is known in Inisheer as *Poureen-shingan*, or the Ant-fold, a name which is far from being so obviously appropriate as the Aran name for the Maiden-Hair, *Dubh-chosach*¹ or Black-footed (plant). The fitness of this native name for the stone-crop was however fully vindicated, when the boy, lifting up a large pad of the plant from where it grew on a slab of warm limestone, showed me underneath a swarm of ants scurrying over the rock in a comic state of panic. *Seangan* is the common Irish word for ant, and *poureen* the local name for a peculiar kind of roofed pen or fold made

¹ Pronounced almost as *Dhoo-hussock*.

of slabs of limestone, and used in Inisheer to shelter young lambs.¹ It is much to be regretted that no Irish botanist with an adequate knowledge of the old language of his country has ever been found to take in hand the preparation of an exhaustive lexicon of Irish plant-names, founded on personal research among the Irish-speaking peasantry.

Taking advantage of a favourable breeze on the 30th May, I took passage from Inisheer in one of the Connemara turf hookers, which constantly ply with fuel between the mainland and the islands, and after a run of an hour and a-half landed at the nearest point of the Iar-Connaught coast, to the east of Cashla bay, and just twelve miles north of Inisheer. I had failed after the closest search in the likeliest places to find any trace of *Neotinea intacta*, the discovery of which had been one of the chief objects of my visit to the Aran isles. But however modest were the results achieved during my short stay, I had no cause to regret the time and labour spent; for no one who takes the least interest in botany, or archæology, or folk-lore, can fail to find congenial food for his tastes in a survey of this most attractive group.

Before bringing these disjointed notes to a close, a few words may be said on the Aran flora as a whole. The total of species for the islands, brought up to date, and retaining in the list some three or four which have not been verified for many years, amounts to 419.² Compared with the total of the Howth flora, 547 species for an area of only one-fourth the extent,³ the Aran district would appear to be decidedly poor.

But compared with Ben Bulbin, and the similarity of the rock formation here to that of the Aran isles makes the comparison a much fairer one, the Aran flora appears to be decidedly rich.

¹ There seems to be no record of their poetic name for the Stone-crop in the Irish Dictionaries of O'Brien or O'Reilly; Cameron in his excellent *Gaelic names of Plants*, Edinburgh, 1883, omits the species altogether, and Wade, in his Latin Catalogue of Co. Dublin plants—a work which is very full in Irish plant names—leaves a blank under *Sedum anglicum* in the space for the equivalent native name.

² Or 420, adding in *Primula veris* (Cowslip), a species which no botanist has hitherto noticed in the islands, though Miss Kilbride, of the Rectory, Kilronan, assures me that she has found it growing sparingly near Kilronan and Killeany, where it flowers much earlier than the Primrose, which latter is abundant in the islands. N.C.

³ See Mr. H. C. Hart's excellent *Flora of Howth*.

For the total of species recorded by Messrs. Barrington and Vowell¹ from the Ben Bulbin district of fully four times the extent of the Aran islands, is only 430, or eleven in excess of the insular flora. And Ben Bulbin, it must be borne in mind, is not only, relatively to the Aran islands, a continental area, but rises over a large part of its surface to a height which places it within the zone of alpine vegetation in Ireland.²

NOTES.

BOTANY.

LIVERWORTS.

Rare Hepaticæ at Leixlip, Co. Kildare.—On the excursion of the Dublin Naturalists' Field Club, 18th June, 1892, a hurried visit was paid to a narrow strip of marsh-land and shallow soil on limestone and diatomaceous deposit, which slopes on each side of the margin of the Ryewater river. It is on the south-west side of the railway station, and is excellent collecting ground for flowering plants, etc. (*Irish Naturalist*, vol. i., p. 101.) On July 2nd, in company with Dr. Scharff and Dr. M'Weeney we paid it a second visit, of more extended duration, when I collected the following liverworts, most of them in a fertile state. *Preissia commutata*, Nees; *Frullania dilatata*, Linn.; *Lophocolea bidentata*, Linn.; *Jungermania turbinata*, Raddi; *J. turbinata*, Raddi, var. *acutiloba*; this form which was quite new to me I fortunately found in fruit; I sent a portion to Mr. Slater, Yorkshire, an excellent authority on Hepaticæ, who says he compared the Leixlip plant with continental ones of *Jungermania coreyrea*, Nees, and they are identical. Dumortier in his last "Hepaticæ Europææ," 1874, gives *J. coreyrea*, Nees, as a synonym of *J. turbinata*, Raddi (p. 79). He also gives on page 65 of the same work *Gymnocolea affinis*, Dmrt.; the two are, however, forms of the same plant, the latter being the obtuse-lobed form of his *J. turbinata*, Raddi, and the Leixlip plant the var. *acutiloba*; it is abundant in this station, I am not aware that this form has ever been found by any person in Ireland before; *Blasia pusilla*, Linn., plentiful (this is a new locality); *Pellia epiphylla*, Dill.; *P. calycina*, Nees, very fine, often immersed in water (this is a new locality); *Riccardia multifida*, Dill.; *R. pinguis*, Linn.—DAVID MCARDLE, Glasnevin.

PHANEROGAMS.

Inconstancy of Colour in Flowers.—Recent references in these pages to the occurrence of White-flowered "Sports" of the Centaury (*Erythraea centaurium*) and other species have no doubt aroused interest in the general question of variability of colour in flowers. The question is one which has attracted the attention of botanists from early times; but so far as I am aware no law of variability has ever been established. Plukenet in his "Almagestum Botanicum," 1696, notes the White Cen-

¹ "Flora of Ben Bulbin"—*Proc. R. I. Academy* 1885.

² Those desirous of learning more about the flora of the Aran islands are strongly recommended to read Mr. H. C. Hart's *List of plants found in the Islands of Aran*, Dublin, 1875.

taury; Caleb Threlkeld, too, the father of Irish botany, as he may be called, in a note in his "Synopsis Stirpium Hibernicarum" (Dublin 1727) observes:—"that many plants which commonly bring forth purple or blew flowers do vary into white or flesh-coloured, as *Bugula*, *Digitalis*, *Centaurium minus*" (*Bugula* and *Centaurium minus* being here old synonyms for *Ajuga reptans* and *Erythraea centaurium*); while Haller, in the second edition of his splendid work on the Swiss flora—"Historia Stirpium Indigenarum Helvetiæ"—Berne, 1768—records the occurrence of White Centaury at two stations in northern Switzerland.

As for the sports of *Ajuga reptans* and *Prunella vulgaris* noted by Mr. Moffat in the January issue of the *Irish Naturalist*, they have been long recognized by botanists. Haller quotes Jerome Tragus of Strasburg, who wrote about the middle of the 16th century, as having recorded the red variety of *Prunella*, and Tabernæmontanus (A.D. 1590) the white, both of these varieties having been observed in Switzerland by Haller himself, the white, as he tells us, in hilly stations, the red in gravelly tracts.

Every practical botanist must early have noted in flowers the superior permanence of yellows to blues and purples, and will agree with the opinion expressed by Haller in the preface to his Swiss flora, where, discussing the value of colour as a specific mark, he lays it down that while yellows are rarely deceptive, blues and purples are frequently so. Increase of elevation above sea-level, I have myself frequently observed to be accompanied by a blanching of blue and purple flowers, as in the Field Gentian (*G. campestris*) and the common Marsh Thistle (*Cnicus palustris*) which, purple, as a rule, in the lowlands, are often white in the hills. Any attempt, however, to connect this blanching with one or more of the many changes of conditions necessarily or accidentally attendant upon change of elevation would soon lead the inquirer beyond the domain of botany pure and simple into the fields of biology and organic chemistry.

Perhaps some reader of *The Irish Naturalist* with the necessary attainments in these provinces could throw light on this very interesting subject. Field botanists by systematic observation of the obvious changes of condition accompanying changes of colour, would, no doubt, help towards the solution of the problem.—N. COLGAN, Dublin.

The Tree Mallow (*Lavatera arborea*) in Ireland.—As Mr. Praeger mentioned (*Irish Naturalist*, vol. ii., page 53.) the Tree Mallow, as growing on isolated and precipitous rocks on Rathlin Island, on the north coast, it may interest readers to hear of the same plant in similar situations off the south-west coast. Large bushes of it may be found growing on the "Little Skelligs Rock," which is fully eight miles from nearest point of mainland, and ten, at least, from nearest houses on mainland. The Little Skelligs is very precipitous, rising in broken pinnacles to about 600 feet; it is and always has been uninhabited, except by the myriads of sea-birds which frequent it in the breeding season; so far as I have noticed on various visits it is totally unfrequented by any seed-eating birds.

Another plant I may mention which grows in great luxuriance is known here as "Skellig Spinach," and used as such—I think it is known as "Good King Henry"—and yet another very abundant growth there, is a very large-leaved Sorrel. These with great tufts of Thrift, both pink and white grow above the wash of the heavy Atlantic rollers that incessantly break round the foot of the cliffs.—ALEX. DELAP, Valencia Island.

ZOOLOGY.

MOLLUSCS.

Valvata cristata in Co. Cork.—It is stated in the December number of *The Irish Naturalist* (vol. i., p. 178) that the above shell seems quite absent from the south-west of Ireland. I have, therefore, much pleasure in recording it from this district, having collected specimens in the slow streams near Cork park, about one and a-half miles from the city.—R. A. PHILLIPS, Ashburton, Cork.

INSECTS.

Sirex gigas in the North of Ireland.—This fine Saw-Fly, though not yet known as a permanent resident in the North of Ireland, is apparently on the increase in that district, owing either to a greater number of imported specimens, or to the establishment of small colonies in spots which have not yet been discovered. While a number of the recent local captures of this animal point to its introduction in timber or otherwise, other specimens were taken in the open country, and many have had a local origin. As the Irish records of this species are few, possibly a note of its recent occurrences in the north-east may be of interest. Between 1885 and 1888 several specimens were taken in the neighbourhood of Belfast, of which no note was kept. In 1888 one was taken in a timber yard in Armagh, and another in a shop-window in the same city (see *Entomologists' Monthly Mag.* vol. xxv., 1st series, p. 132). In 1889 three were found in Lord Lurgan's vinery at Lurgan. In 1890 one was taken at the Sirocco Works at Belfast. The following year yielded a number of specimens. Mr. John Hamilton received one which was captured in a Belfast warehouse; two Armagh timber yards yielded a specimen each; one was taken at Conlig, Co. Down, by Mr. G. B. Coulter, and several in the neighbourhood of Holywood. In 1892 Mr. J. H. Davies captured two in the open air at Lisburn; Lady Clanmorris forwarded a Bangor specimen to the Belfast Museum; one occurred in Messrs. Martin's timber yard in Belfast; Dr. J. S. Darling forwarded me a specimen taken on a grocer's window in Lurgan; and a very fine example was found by Mr. H. T. Mercer crawling on a road at Cultra, near Holywood. All the specimens which I have seen, or which were described to me, were females. I have heard of several other occurrences, of which, however, I have not been able to procure authentic information. I have to thank Rev. W. F. Johnson, M.A., Dr. J. S. Darling, and Messrs. S. A. Stewart, R. M. Young, John Hamilton, and J. H. Davies, for assisting me in the above compilation.—R. LLOYD PRAEGER.

BIRDS.

The Eagle Owl (*Bubo maximus*) in Ireland, and former scarcity of the Magpie (*Pica rustica*).—No record of the capture of this large Owl in modern times in Ireland has been substantiated, I believe, but the following memoranda may be of interest, as it is quite possible that when natural history pursuits become more generally in favour, many rare species may be discovered. When in conversation lately with Robert B. Evatt, Esq., of Mount Louise, Monaghan, now a very old man, he assured me that many years ago he had seen two Eagle Owls at rest in the daytime on a wooded island in upper Lough Erne, belonging to Mr. Porter of Belleisle, and was deeply impressed by their size and noble appearance. Mr. Evatt is a practical naturalist of long and wide experience, and Mr. Williams, senior, the well known taxidermist of Dublin, owes his first lessons in bird-stuffing to his instructions. He is thoroughly conversant with our common species of Owl such as the Long-Eared and Woodcock Owls, so that his testimony cannot be well ignored. But, in the absence of a specimen, and of further corroboration it is insufficient to entitle the species to a place in the category of modern Irish birds. The bird appears, however, anciently to have been acknowledged indigenous here, as in the MS. preserved among the Molyneux documents, and referred to in my remarks under the heading of "Is the Frog a Native of Ireland," I find "ye cock of ye wood *Urogallus major*," and "ye Great Irish Owle," set down as "Birds found in Ireland, not in England." With reference to the Magpie which is entered as "rare in Ireland but common in England" (*i.e.*, about the year 1700), there is also an interesting record of a flight of Magpies from England in 1670 "landing where the English first did (Barony of Forth)," Co. Wexford.—WM. FRAS. DE V. KANE, Drumreask, Monaghan.

Mealy Redpolls (*Linota linaria*) on Achill Island.—In the early part of February a specimen of the Mealy Redpoll was shot on Achill island, Co. Mayo, and has been presented to the Dublin Museum through Mr. Williams. It appears that a small flock of about eight had remained on the island during the whole winter, having evidently then been on their way south from their northern summer quarters. The track of this bird's migration from northern Scandinavia, where it breeds, to the south, is supposed to pass down the east coast of Scotland and England, and the appearance of the species on the west coast of Ireland, must, therefore, be looked upon as a quite exceptional occurrence. Mr. A. G. More gives only a single Irish record in his "List of Irish Birds."—R. F. SCHARFF, Dublin.

The Serin (*Serinus hortulanus*) in Ireland.—Mr. E. Williams writes to the *Zoologist* for March:—On the 2nd of January one of our local bird-catchers brought me a bird which he described as a "Mule Siskin." I was much pleased to identify it as a Serin, *Serinus hortulanus*, in adult winter plumage, the first occurrence in Ireland. From the fact of never seeing a caged bird of this species here, and the capture of upwards of a dozen in England, I think there can be little doubt that this was a genuine wild bird, and as such, entitled to be added to our Irish list.

Waxwing (*Ampelis garrulus*) in Co. Wicklow.—A specimen of the Waxwing, *Ampelis garrulus*, was shot in the village of Delgany, Co. Wicklow, in the early part of January last. It was exceedingly fat, and had been feeding on holly-berries.—E. WILLIAMS in *Zoologist* for March.

Waxwing in Co. Antrim.—A Waxwing was shot at Ballinderry, Co. Antrim, a day or two ago, by a farm labourer.—"J. A. B.," in *Land and Water* of 4th March.

Waxwing near Londonderry.—Another specimen of the Waxwing was shot near Londonderry during the last week of January, by Mr. Lawrence Nash.—D. C. CAMPBELL, Londonderry.

Bittern (*Botaurus stellaris*) in Ireland.—Seeing a notice in last month's *Irish Naturalist*, p. 86, that the only Irish specimen of the Bittern obtained last year was one shot by Lieut.-Col. Oakes, Kilkee, Co. Clare, I mention that Thomas Plunkett, Esq., Enniskillen, has written to me that he obtained a fine specimen of the Bittern on the 5th January, 1893, about seven miles from that place. I did not think this of sufficient interest to record earlier.—ARTHUR J. COLLINS, Belfast.

Bewick's Swan (*Cygnus bewickii*) in Co. Armagh.—These swans appeared to be more numerous near Loughgilly than usual this winter. The first record I received was on January 15th, when five "swans" were reported flying south. On the 18th five were again reported north-west. On the 26th I was informed that five birds were feeding on a piece of marshy land that had been flooded over by the heavy rains, and they were reported to be still there on the 28th. On the 2nd of February I received a message that twelve birds were on the same bog, and on the 4th I was informed that "four or five" were on a small lake known as Mulloughmore. On the 7th, seventeen were on the bog first mentioned; I was told they went away when shot at. They were heard calling by my informant the same night.

On the 8th fifteen birds passed over in an easterly direction, which from their voice I identified as Bewick's. On the 9th I found five birds on Mulloughmore lake which were also undoubtedly Bewick's Swans.

In previous winters we only had small flocks of four to eight, which seldom remained for long.—H. LYSTER JAMESON, Killincoole, Castlebellingham.

Ferruginous Duck (*Nyroca ferruginea*) near Athlone.—Mr. E. Williams writes in the *Zoologist* for March, that a specimen of this duck was shot on the Shannon, near Athlone, on 21st January last, by Mr. R. Surtington.

GEOLOGY.

Supposed Animal Footprints in Old Red Sandstone Rocks.

—A paragraph in the *Tuam Herald* of 3rd February, seems to demand attention. It states that “on the old road between Molranny” (Malarranny of the one-inch Ordnance Map) “and the village of Bonnyglan” (Bolinglanna of the map?), “and within a mile of the latter old mining station, there are imprinted on the solid rock footprints of huge animals.” These places are on the mainland, east of Achill island, and at the foot of Curraun Achill. The Geological Survey have here mapped and described (sheet 74, and memoir to sheets 63 and 74) a tract of Old Red Sandstone lying on the schists and quartzites, the latter being possibly Precambrian. If there are genuine footprints in this rock, the fact would be of great importance, though there would be no reason to ascribe them to a mammal, as is hinted by the writer in the *Tuam Herald*. This writer, however, is clearly familiar with geological terminology, and it becomes imperative for some one to set the question of these alleged footprints at rest. They may be footprints of a “quadruped” with its “calf” running beside it, as suggested by the writer in the *Herald*, or rain-pittings, gradually enlarged; or the hollows from which a number of concretions have fallen away. If there is any likelihood of their being footprints, such as occur in the Triassic sandstones of England, it is to be hoped that some one will be able at once to photograph them, to measure them and the distances between them, to draw them accurately in plan, and even to take plaster impressions from them. Any investigation of them will be awaited with interest by the readers of *The Irish Naturalist*. If the writer in the *Tuam Herald* is recording what he himself has seen, it becomes his scientific duty to prove his statement at the earliest opportunity; since the occurrence of true footprints in this sandstone may give us evidence of the existence of amphibians in the lowest Carboniferous of Ireland, or even in the upper Devonian series. This is, perhaps, too much to hope for.—GRENVILLE A. J. COLE, Dublin.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a Japanese Deer from Sir Douglas Brooke; a pair of Bramble-Finches from Miss Roberts; four Wild Ducks from J. H. Sutton, Esq.; and a monkey from C. G. Fitzgerald, Esq.

4,300 persons visited the gardens in February.

At the Annual Meeting on January 31st, Dr. S. Gordon was elected President, and Dr. A. Traill, Rev. Dr. S. Haughton, Mr. W. Findlater, Prof. Haddon, and Mr. S. U. Roberts, Vice-Presidents for 1893. Rev. Dr. C. W. Benson, so well known for his ornithological work, was elected an Honorary Member of the Society. The Report for 1892 states that the year has been a very successful one, the number of visitors having increased, and a sum of £264 being balance to the credit of the Society. An outdoor aviary will shortly be commenced and should prove an attractive feature. Two very fine lion cubs (male and female) were born in the gardens during 1892. It is possible that hybrids between a tiger and a lioness may be produced during the present year; an interesting account of the former production of such hybrids is given in an appendix by the Secretary, Dr. V. Ball, C.B., who has since the publication of the Report obtained new information on the subject.

DUBLIN MICROSCOPICAL CLUB.

FEBRUARY 15th.—The Club met at MR. A. ANDREWS. *Specimens of Eproccum purpurascens* were shown by MR. GREENWOOD PIM. This fungus

occurred on young leaves of *Congline australis*, recently killed by frost in his garden. The species was somewhat striking both to the naked eye and under the microscope, on account of the vivid red mycelium which in large quantities surround the spores, which do not very materially differ from those of *E. neglectum*.

Venturia sp. was exhibited by MR. F. W. MOORE. The specimens were found growing on the leaves of *Nardila scalaris*, collected in Co. Wicklow. They have been submitted to Dr. M. C. Cooke, who stated that this must be a new species of *Venturia*. Hitherto only one species has been found on cryptogams, and this is much larger than the species which was submitted.

Rhopalorhynchus clavipes was shown by MR. G. H. CARPENTER. This is a pycnogon discovered by Prof. Haddon in Torres straits, and described and figured by exhibitor (*Sci. Proc. R.D.S.*, n.s. vol. viii.); it is remarkable for the extreme attenuation of the body, this character of the group being specially developed in the present genus. The femora are swollen distally, a character from which the species is named. A false leg was shown under the compound microscope. This appendage is ten-jointed, the terminal joints bearing scythe-shaped spines. The complicated series of muscles for moving the joints was well shown in the preparation.

Anthelia juratzkana, Limpr. (*fertill specimen*) was shown by MR. D. M'ARDLE, who had collected it amongst the rocks at the Bailey Light-house, Howth, in 1891, and had since found it growing in small quantity on Ireland's Eye and Dalkey island. (See "The Plants of Dalkey island," *Irish Nat.*, vol. i., p. 134, where a list of the localities known for the plant is given). He also exhibited a figure of the plant drawn by Mr. W. N. Allen.

BELFAST NATURALISTS' FIELD CLUB.

FEBRUARY 21st.—The President (MR. J. VINYCOMB, M.R.I.A.), in the chair. MR. FRANCIS JOSEPH BIGGER, M.R.I.A., read a short paper on "Some Local Folk-lore." MR. WILLIAM GRAY, M.R.I.A., delivered an interesting lecture on "Worked Flints, Ancient and Modern."

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

FEBRUARY 17th.—The President (PROF. FITZGERALD, M.I.C.E.), in the chair. MISS ALICE MILLIGAN read a paper entitled "Historic Ulster," illustrated by limelight views.

MARCH 7th.—The President in the chair. DR. SHELDON, M.A., read a paper on "Education—a Critical Examination of the Theory and Practice of Dr. Arnold, of Rugby." MR. W. H. PATTERSON, M.R.I.A., read a paper on "Hints on collecting Irish Folk-lore."

ARMAGH NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

MARCH 6th, 1893.—REV. W. F. JOHNSON, M.A., F.E.S., President, in the chair. The President exhibited specimens of *Sphinx convolvuli* from Armagh and Gloucestershire, and of *Deilephila galii* from Wallasey, Cheshire, and remarked on the various theories as to their sudden appearance in numbers in particular years.

CORK NATURALISTS' FIELD CLUB.

FEBRUARY 15th.—The President, PROF. MARCUS HARTOG, in the chair. MISS H. A. MARTIN, M.R.C.P., read a paper on "Mushrooms and Toadstools," explaining the propagation of these curious and interesting organisms, and the mode of growth, shape, and peculiarities of

those species most frequently brought under our observation. She also showed the fatal beauties and brilliant colourings of the poisonous kinds when compared with those which are edible. Her personal observations on fungi in fish were most interesting. Mr. O'Sullivan gave his experiences of rust on wheat.

MARCH 15th.—The President, PROF. MARCUS HARTOG, in the chair. The President called attention to the microscopic appearance of fish-scales as a means of identifying fish, and referred to a case reported in the last number of the *Field*, where, at Youghal, a number of salmon poachers were convicted, the microscope being used in court to demonstrate the characters of the scales to the bench.

MR. BENNETT exhibited *Hymenophyllum tunbridgense* from Glengariffe.

MISS MARTIN exhibited a rare coral dredged by the Rev. W. S. Green, off the coast of Cork in 1890.

The President announced that Mr. T. Dillon had undertaken to edit notes for a paper on the "Earthworms of Cork," kindly sent by the Rev. Hilderic Friend.

MR. T. FARRINGTON, F.C.S., read a paper "On the Dolomite or Magnesian Limestone of Cork," giving a full description of its mode of occurrence, characters, and chemical analysis. He suggested that in post-Carboniferous times, probably Permian, after the denudation of the Coal Measures, and the dynamic action which had determined the present ridges and troughs, the fissured exposed surface of the limestone was depressed below the Permian sea, and then filled by magnesian deposit. Glacial erosion was probably the cause of the removal of this Permian dolomite from the general surface of the land. After observations from the President and Dr. Knight, Mr. Shaw, C.E., criticised the assumption that gaping fissures could be formed in a synclinal trough like that of the Cork limestone. In support, however, of the author's views he referred to Permian beds at Dingle, which he had visited. Mr. Porter dissented from the view that the dolomite was Permian; he thought that the limestone had been dolomised *in situ*, possibly by the action of humic acid, etc., in the neighbourhood of faults. Mr. Bergin also took part in the discussion. Mr. D. O'Mahony, F.C.S., called attention to the remarkable absence of magnesia in the limestone rock in the neighbourhood, and in the water derived therefrom.

At various meetings of the Club, PROF. M. M. HARTOG has mentioned the following rare or interesting finds in "Pond Life"—

SCHIZOMYCETES:—*Beggiatola roseopersicina*, Zoff., in tanks at Queen's College—Lankester's "Peach-coloured Bacterium," the *Clathrocystis* form appearing as specks visible to the naked eye.

SAPROLEGNEÆ:—*Aphanomyces* sp., Bennet's lough, two miles north-east of Cork.

DESMIDIACEÆ:—*Didymoprium grevillei*, Kütz., Bennet's lough.

RHIZOPODA:—*Pelomyxa palustris*, Greep, tanks at Queen's College. This gigantic multinucleate amœboid attains here a diameter of over one-twelfth inch.

CILIATA:—*Urocentrum turbo*, Müll., *Loxodes ehrenbergii*, tanks at Queen's College.

TURBELLARIA:—*Catenula lemna*, Dugès, *Microstomum lineare*, O. F. Müll., *Mesostomum rostratum*, Ehrb., *Planaria torva*, Bennet's lough; the first two species show fission exquisitely.

ROTIFERA:—*Floscularia longicaudata*, Huds., tanks at Queen's College; this rare species is only recorded from Scotland; *Taphrocampta* sp., lower pond at Queen's College, this species has both a malleoramate mastax and two distinct pink eyes, thus differing from either species described by Hudson.

OLIGOCHÆTA LIMICOLA:—*Chaetogaster crystallinus*, a large species revealing its structure under a pocket-lens, in tanks at Queen's College;

Æolosoma varians, Bennet's lough and tanks at Queen's College; *Æ. sp.* with granules colourless instead of green or red, Bennet's lough; *Bohemilla ornata*, Vejd., Bennet's lough, this species has tufts of as many as seven dorsal setæ, which are frayed or plumose, giving the worm a very polychæte appearance.

LIMERICK NATURALISTS' FIELD CLUB.

MARCH 14th.—The President, MR. A. MURRAY, in the chair. MR. ROBERT GIBSON read a paper entitled "An Introduction to the Study of Geology," illustrating it with coloured diagrams and maps, and examples of local rocks and fossils. Mr. Murray, Mr. Taylor, Mr. Gibson, Mr. Belshaw, and Dr. Todd took part in the discussion which followed.

MR. F. NEALE showed specimens of the Greasy Fritillary (*Melitæa aurinia* var. *hibernica*), and a colony of its young gregarious larvae spun up in their winter domicile, or web. This insect appears to occur plentifully at Cratloe, and Mr. Kane states that it is the distinctively Irish type, and as such is an interesting record.

ROYAL DUBLIN SOCIETY.

JANUARY 11th.—PROF. SOLLAS in the chair. DR. J. JOLY read a paper entitled "A Suggestion as to the cause of the bright colour of Alpine Flowers." Flowers growing at high altitudes are much brighter than those of the same species in valleys. This has been explained by Helmholtz and others as due to the brighter sunlight; but Dr. Joly considers it to be the result of a process of natural selection of the brighter flowers, which alone succeed in attracting insects, and so securing fertilisation; as the short seasons, and great destruction of insects by cold in alpine regions must render the struggle for existence among flowering-plants severe. Prof. T. Johnson and Rev. W. S. Green took part in the discussion, the latter remarking that in the New Zealand Alps the flowers at high elevations are very pale.

PROF. G. A. J. COLE gave a paper on *Hemitrypa hibernica*. This interesting fossil will be described for readers of *The Irish Naturalist* in his forthcoming paper on the Irish Fenestellidæ.

FEBRUARY 21st.—A paper on Human Sacrum was communicated by PROF. PATERSON.

ROYAL IRISH ACADEMY.

FEBRUARY 13th.—PROF. M. M. HARTOG read a paper "On the Cytology of the Saprophytæ."

FEBRUARY 27th.—DR. C. R. BROWNE read a paper "On some Crania from Tipperary." A grant of £20 was voted to a Committee consisting of Dr. Scharff, Mr. R. Lloyd Praeger; Mr. A. G. More; Mr. R. M. Barrington; Mr. Greenwood Pim; Mr. H. Dixon; Dr. McWeeney; Mr. G. H. Carpenter; Professor T. Johnson; and Professor E. P. Wright, to aid them in framing a Report on the present state of our knowledge of the Flora and Fauna of Ireland, and as to what is needed to bring this knowledge up to date.

This Committee held its preliminary meeting on March 18th. Dr. Scharff was elected chairman and treasurer, and Mr. Carpenter convener. Prof. E. P. Wright explained the objects for which the Committee had been formed. The section appointed to prepare the preliminary report on the Irish Flora consists of Mr. H. H. Dixon, Prof. T. Johnson (convener), Dr. McWeeney, Mr. A. G. More, and Mr. Greenwood Pim. The section to report on the Irish Fauna, including Tertiary Palæontology, consists of Mr. R. M. Barrington, Mr. G. H. Carpenter, Mr. R. L. Praeger, and Dr. Scharff.

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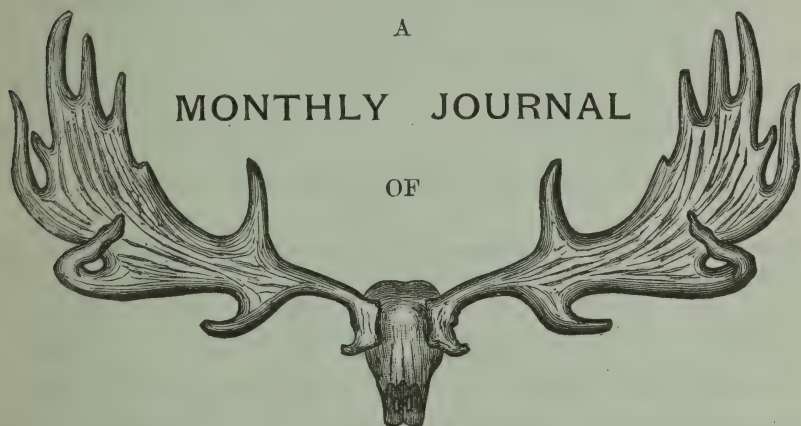
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The Irish Naturalist.

VOL. II.

MAY, 1893.

No. 5.

THE HUMP-BACKED WHALE ON THE IRISH COAST.

BY ROBERT WARREN.

I HAVE much pleasure in bringing under the notice of Irish naturalists an interesting addition to the list of Irish mammals, by the occurrence on our shores of that rare visitor to British waters, the Hump-backed Whale, *Megaptera boops*, Fab., (*longimana*, Rud.), a fine female specimen having come ashore on the sands of Killala bay, at Enniscrone, Co. Sligo, on the 21st March. The animal had probably been feeding too close to shore in the shallow water, and on taking the ground, was overpowered by the surf, and cast upon the sands; it lived for some hours, lashing the water furiously with its tail, and spouting from its blow-holes, and from time to time, opening and shutting its mouth, occasionally giving vent to great sighs or grunts. The body was very clumsy-looking, and so thick, as to look out of all proportion to its length, and was probably between twenty and thirty feet in circumference. Black in colour all over the upper parts (the under being buried in sand were not visible) except the long, narrow flippers, which were white, with a few black spots on the upper sides, and a few patches of white on the margins and under the side of the flukes, and also on the longitudinal folds, or pleats of skin, on the sides of the throat, giving the latter a marbled appearance. To the edges and under sides of the flippers and flukes, and to the under part of the lower jaw were attached a large number of that barnacle (so like a gigantic *Balanus*), *Coronula diadema*, varying in size from an inch and a-half to two inches in diameter, and an inch and three-quarters in height; and so firmly fastened to, or embedded in the skin, that both blubber and skin had to be cut

away before the shells could be removed from their position. The long, narrow, straight flippers, with scarcely a curve perceptible, were notched or scalloped along the edges, as was also the posterior margin of the flukes. The head was broad and flat; the upper jaw very flat, and depressed between the lower jaw bones, which rose above it when the mouth was closed. On the upper jaw were three rows of tubercles; one of seven, in the centre, running from end of snout to blow-holes, from six to seven and a-half inches apart in the row, and varying from half to an inch in height; one of eleven on each side, just above the lips, reaching almost to the eyes; and in two places in each side row, for a space of six or seven inches, the line of tubercles was double; also a row of six or seven, each side of the lower jaw, just below the lips. The baleen, as well as I could judge, without measuring, appeared to be from twelve to fifteen inches in length, was black in colour, and fringed at the ends with coarse, greyish-brown hairs. The small dorsal fin, placed very far back, was between six and seven inches in height. The dimensions, carefully taken with a string, are as follows:—

Length from fork of tail to dorsal fin, ..	10 feet 3 inches.
From dorsal fin to end of snout, ..	18 „ 10 „
Total length over round of back, ..	29 „ 1 „
From end of snout to blow-holes, ..	4 „ 7 „
Breadth of flukes,	9 „ 0 „
Length of flippers from humerus, ..	9 „ 2 „

Although so common on the coasts of Norway and Iceland, this whale appears to be of rare occurrence in British waters, this being the first of the species known to have visited the Irish coast; while Flower and Lydekker, in their “Mammals,” published in 1891, mention only three examples as having visited the British coasts, one at Newcastle in 1839; a second at Dee in 1863; and a third at the mouth of the Tay in 1883-4, thus showing the extreme rarity of its occurrence on our shores; though, of course, it is not improbable that some specimens may have been unrecognized, or mistaken for other species when thrown ashore. However, the unusually long white narrow flippers, thick, robust body, and flat depressed tubercle-covered head, should always identify this whale and distinguish it from others.

The skeleton has been secured for the Dublin Museum.

THE EARTHWORMS OF IRELAND.

BY REV. HILDERIC FRIEND, F.L.S.

(Continued from page 90.)

GROUP II. **Disjuncta.**

As in the last group we had only one indigenous species of worm for examination, so in the present instance. The paucity of species, however, is balanced by the interest and peculiarity of this solitary illustration; and from facts which have come under observation recently, it would appear as though the Irish representative of the group had begun to diverge from its English and European type.

Allolobophora profuga, Rosa.—THE RAMBLER. A fine, steel-blue worm, unlike any other British species in colour. The girdle and last half-dozen segments of a yellowish hue, the latter owing to the presence of turbid fluid, such as is secreted in great quantities by the Brandling (*A. fetida*, Savigny), and others. When living, it is from five to eight inches in length, averaging six. There is a total number of from 120 to 160 segments in the body. The worm is cylindrical, tending to octagonal, owing to the disjunct arrangement of the setæ, which are much wider apart than in the groups previously studied. The tail tapers rapidly to a point, and is conspicuous, by reason of the striking difference in colour existing between it and the rest of the body. The girdle normally occupies segments 30 to 35, along the innermost four of which the band is stretched. Thus, this species closely resembles the true *Lumbrici*, with their six-segment girdle, and four-segment band. There is a tendency in this species, however, for the band to project beyond the four segments, or run into the two outermost. Well marked and prominent papillæ on segment 15 carry the male pores. A peculiar odour, as of garlic, or some similar vegetable, is given off when the worm is irritated, just as the Brandling raises a recollection of boiled cabbage under similar circumstances. I find this worm is not averse to very poor, clayey, cold soil. Here it is undoubtedly of great service, and, as it does not come out of its burrow, like the *Lumbrici*, it does not possess the flattened tail.

Mr. Trumbull, of Malahide, has recently found several specimens of the Rambler, and observes that the girdle and band are shifted forward one segment, beginning on the 29th, instead of the 30th. As specimens have been submitted to me for examination, I am able to confirm the observation, and prove the identity.

GROUP III. **Mucida.**

The next group of the genus *Allolobophora* contains a larger number of species than any other. We shall discuss the different species in order, a diagnosis of the group having been already given (p. 42). The worms are not usually addicted to burrowing, or casting up mould, so that these species are, to a large extent, out of the reckoning in such a work as Darwin's "Vegetable Mould and Earthworms." There are close affinities with the other groups, the arrangement of the setæ linking these species with those already studied, while the habitat, exudation, and shape, lead us naturally on to the groups which follow. There is no fixed number of segments composing the girdle, as in *Lumbricus*, neither do the clitellar papillæ (*tubercula pubertatis*) follow any definite law. They may occur on contiguous or alternate segments, and be band-like, or papillose.

Five species fall under this heading, the name of the group having special reference to the peculiar exudations.

***Allolobophora turgida*, Eisen.**—TURGID WORM. Very common, and widely distributed. Variable in size and colour; sometimes six inches in length, and considerably larger in the region of the essential organs (segments 8 to 12) than elsewhere. Of a dull flesh-colour, exuding slime, or turbid fluid, when irritated. Girdle covering the 28th to the 34th segments, the papillæ being on the alternate segments 31 and 33. Often when the worm is adult these seem to form a band which extends across the intervening segment, so that it may easily be mistaken for the much rarer species which follows.

DISTRIBUTION IN IRELAND. Cork (Miss Martin and Miss Abbott); Valencia, Co. Kerry (Miss Delap); Knocknacarry, Co. Antrim (Rev. S. Brenan); Cashel, Co. Tipperary (Lieut.-Col. R. E. Kelsall); Killencoole, Co. Louth (Mr. Jameson), etc.

***Allolobophora trapezoides*, Dugès.**—TRAPEZE WORM.—Very similar to the last, with which it has been repeatedly confused. Rosa was the first to thoroughly disentangle them. Much rarer than the foregoing. I have only one well-authenticated Irish locality at present. The girdle covers segments 27 to 34, and the clitellar band extends over three consecutive segments (31, 32, 33). Rosa has correctly pointed out that the shape of the segments, and the number in any given length, differentiate this species from the last.

DISTRIBUTION IN IRELAND. Valencia, Co. Kerry (Miss Delap).

***Allolobophora mucosa*, Eisen.**—MUCOUS WORM. Readily distinguished from the others by its bright, fleshy-red colour, and the white granular deposit from the exudation when placed in spirits, as well as by the position and shape of the girdle. The worm is usually the smallest of the group, two or three inches long, and much more delicate than its allies. The girdle usually extends from the 26th to the 32nd segments, on the 29th, 30th, and 31st, of which the band is seen so placed as to extend the girdle ventrally, and give it the characteristic appearance which Eisen has figured with such truth and accuracy. Mr. Trumbull has sent some small specimens from brick-clay, taken at Malahide. The longest adult did not exceed one and a-half inches, and it is evident that habitat has a great deal to do with their size.

DISTRIBUTION IN IRELAND. Cashel, Co. Tipperary (Lieut.-Col. R. E. Kelsall); Valencia, Co. Kerry (Miss Delap); Dublin (Dr. Scharff), etc.

***Allolobophora chlorotica*, Savigny.**—GREEN WORM. Often looking, when coiled up in its sulky, sluggish fashion, exactly like the dirty larva of some large fly. The most common and variable of all our indigenous species. Several well-marked varieties might be enumerated, if colour, shape, and habitat were sufficient to form a basis. In every case, however, the specific characters are the same—viz., girdle extending from segment 29 to segment 37, and three pairs of papillæ situated on segments 31, 33, 35. The colour varies from dirty green to dull yellow, and from clay-brown to fleshy-red. Occasionally a bright emerald green is met with. It lurks under stones and refuse, moves indifferently, and exudes an unusual amount of dirty yellow, turbid matter.

DISTRIBUTION IN IRELAND. Cork, Dublin, Tipperary, Louth, and wherever specimens of worm-fauna have been collected.

***Allolobophora cambrica*, Friend.**—WELSH WORM. Has the colour and general appearance of the Mucous Worm, and the girdle arrangement of the Green Worm. To determine its specific character dissection is necessary, when it will be found to present features which differ from each of its nearest allies. First found in 1891 in Wales, and recently received from Ireland. Probably fairly distributed, but apt to be confused with one or other of the better-known species.

DISTRIBUTION IN IRELAND. Blackrock, Co. Dublin (Miss Kelsall).

(TO BE CONTINUED.)

THE SELBORNE SOCIETY.

BY GEORGE A. MUSGRAVE, F.R.G.S., F.Z.S.

It is rather a bitter satire on our civilisation that a society for the protection of the harmless objects of wild nature from unnecessary destruction should be "a want of the day." Yet such is the fact. With the facilities now afforded for locomotion, thousands of excursionists, in the place of half a dozen quiet visitors, are hurled periodically upon a limited tract of country remarkable for its beauty or associations, and instead of doing their utmost, as intelligent beings, to preserve the objects, such as trees, flowers, ferns, birds, or architectural remains, enhancing the beauty, or giving additional interest to the spot, they destroy them.

The evil thus wrought, in great measure thoughtlessly, is a novel one, hence the necessity for seeking to overcome it by a novel method. Those who founded and built up the Selborne Society felt that individual protests made against the evil were a mere waste of strength, which could only be obtained in fullness by the united action of representatives of all classes, and by the free use of the local knowledge and tact possessed by members of branches. The adherence of sympathetic members was not difficult to obtain, because the objects of the association are such as interest the naturalist, the artist, the poet, the wise lover of nature, and the archæologist; whilst the co-operation of owners and occupiers of land, gamekeepers, woodreeves, and others engaged in rural occupations, was not wanting.

Such, in brief, is the history of a union for the protection of harmless birds and other creatures, a society for the preservation of trees and plants, a coadjutor in the good work of the Kyrle, Footpath, Ancient Buildings, and other kindred Associations. One fact concerning the society is peculiarly interesting, and that is, that several of the collateral descendants of Gilbert White, the author of "The Natural History of Selborne," in whose honour the society is named, take an active part in promoting its objects.

Primarily its energies were chiefly devoted to the collection and circulation of reliable information respecting the excessive destruction of birds for ornamental purposes, with the result, that the Audubon Society was founded in the United States,

and, recently, the Birds' Protection Society in England, under the patronage of the Duchess of Portland; and also that a more willing and hearty support was given in the Colonies and elsewhere to the Birds' Protection Acts. The Society has based its appeal for preservation on scientific, æsthetic, and economic grounds, and has a due regard for sentiment, without which our daily life would be a dreary and monotonous toil. Still, appeals to uninstructed persons do not always prove successful, therefore, in order to obtain voluntary co-operation, it seemed desirable to encourage the study of natural history. If an interest can be excited in young people in the structure and habits of an animal, or plant, by hedgerow and field, then one long step in the right direction has been taken towards creating in them a lasting taste for a pursuit demanding no costly appliances, and dealing with an inexhaustible store of material always at hand.

With the acquisition of a certain amount of elementary knowledge, the habit of accurate observation and careful investigation is fostered; thus a faithful follower of Gilbert White is developed, ever on the alert for note-making, and always capable of writing an intelligible and truthful account of some occurrence likely to interest the readers of the Society's organ, *Nature Notes*. This magazine is like the sisters' only doll in *Punch*—"it's all of our magazine," containing, from its most learned articles to the shortest paragraphs, in "stuff" voluntarily contributed by members of all sorts and conditions, and of all ages.

The Editor, Mr. James Britten, F.L.S., a well-known botanist, is especially grateful to persons who will, without regard for fine writing, send him short accounts of what they themselves see and hear. We live in an age of close observation, looking forward to a time when much valuable knowledge will be derived from collections of even the humblest notes, provided that they have been recorded simply and truthfully.

In almost every branch of the Society there are members who, being expert naturalists, find time in which to give short addresses to children or unskilled members, as well as to the general public, and there also gradually arise ladies and gentlemen who, with an aptitude for imparting information, try to follow successfully in the direction so ably indicated by Kingsley in his lectures, and in "Madam How, and Lady Why?"

The progress, however, of such a society must be necessarily slow, so great, alas! is the indifference, even amongst educated people, to anything demanding a little attention and mental effort. University extension lecturers find subjects which are not "amusing," fall very flat.

Take it altogether, however, the Selborne Society has steadily increased in influential and numerical strength, and branch after branch has been formed, and the area of voluntary guardianship of the fauna and flora of fresh neighbourhoods secured. There is no reason why branches should not quickly fill up, swarm, and make others in the same way in Ireland.

Unfortunately, obscured by political storm-clouds, Ireland, one of the most delightful countries in the world for the tourist, artist, and sportsman, with all its capabilities for rapid development, with its winter and summer health-resorts derelict, or checked in healthy growth, has almost dropped out of the list of the playgrounds of Europe. But the day will come when it will be "fashionable," and then the Irish Selbornians will rejoice that they have protected all that material which once made many a favourite spot in England so attractive, and which has been sacrificed to greed and stupidity.

The first step is to get a few kindred spirits to agree to form a branch, and then to direct the secretary *pro. tem.* to write to the Secretary of the Selborne Society, 9 Adam-street, Adelphi, London, W.C., for the leaflet "How to form a Branch," and a form of application for a warrant. When the branch is formed, it is useful to get some local land-owner to follow the example of Mr. Skrine, of the Bath Branch, Lord of the Manor of Claverton, by giving a "Selborne at Home," when local botanists, naturalists, and archæologists, can improve the occasion, and do a great deal towards directing usefully the energies of the members. Ireland being particularly rich in rare plants, a voluntary guardianship of their habitats will, of course, suggest itself.

The great thing, however, to impress on old and young is that, true to Gilbert White, the Society is essentially an observing rather than a collecting one.

The minimum subscription has remained the same as when the writer of this article and his wife originated the Society; for those who assisted in the organization hoped that

half-a-crown would be within reach of National and Board School teachers, factory hands, and others. Unfortunately, however, it has been found to be not low enough for persons receiving small incomes, and not large enough to comfortably bear the cost of issuing the Society's organ, *Nature Notes*, which, of course, considering the limited circulation of all scientific periodicals, is absurdly cheap—2d. per part! Owing to larger subscriptions and donations from wealthy people and the contributions from the branches, the Committee have been enabled to defray the cost of the magazine, the rental of office, and the honorarium of the Secretary, but not to print leaflets for free distribution broadcast in the way originally contemplated. This is a pity, because cyclists, fishermen, and other wanderers, could do a great deal amongst people prone to kill every rare bird, uproot rare plants for sale, and otherwise do mischief. Every year it is getting more difficult to obtain specimens of particular birds for local museums, and what makes it more annoying is that the birds are shot and carried away by private persons for the pure love of acquisition, and eventually lost in some distant auction.

A capital plan in starting an association such as the Selborne Society, is to get each member to secure ten others, and then the society "snow-balls" on in that way, and cheereth the hearts of the Committees.

Amongst the very earliest adherents of the society were Lord Cork's sister-in-law, the Hon. Mrs. R. C. Boyle, well known as E. V. B., without whose artistic and literary powers and influence very little progress would have been made. Through her, H.R.H. Princess Christian became chief Patroness, and the lamented Laureate, President. Louisa, Marchioness of Waterford, a lady of extraordinary abilities, Lady Muncaster, Professor Haddon, Mr. Burbidge, and others also lent a helping hand.

The Committee in England cordially wish every success to the efforts now about to be made in Ireland to establish branches of a society which admittedly is not only doing a good work, in the prosecution of its various objects, but offers a common ground of fraternization between resident naturalists and visitors from distant parts, who are sure of finding in a Selbornian, a guide, philosopher, and friend.

THE FLORA OF COUNTY ARMAGH.

BY R. LLOYD PRAEGER, B.E., M.R.I.A.

(Continued from page 95).

- Hypericum dubium**, Leers., var. **maculatum**, Bab. N. M. S.
Throughout the county, and as common in Armagh as *H. perforatum*. Ardmore, H. W. L. spec.! By the railway near Lurgan station, old quarry two miles S.W. of Lurgan, roadside at Glen Eyre near Portadown, Tynan Abbey grounds, lane two miles south of Killilea, roadside a mile S.E. of Tanderagee, roadside two miles west of Tanderagee, by the railway south of Poyntzpass, roadside between Poyntzpass and Scarva, abundant by the railway between Goraghwood and Newry, and by the Warrenpoint railway below Newry; about Armagh *H. dubium* is absent, and *H. perforatum* common, R. Ll. P. The abundance of this species in Armagh contrasts strangely with its extreme rarity in Antrim and Down.
- H. humifusum**, Linn. N. — S.
Very rare in the county. On the railway near Narrow-water, and roadside near Lislea south of Armagh, R. Ll. P.
- † **Acer campestre**, Linn. N. — —
About Loughgall, More *N. H. R.*! In Mr. More's paper and *Cyb. Hib.* this tree is admitted as a native at Loughgall. I did not find it anywhere in the county in such situations as to justify an unquestioned admission to the indigenous flora.
- * **A. pseudo-platanus**, Linn. N. M. S.
Occasionally apparently wild, and frequent in hedges, etc., but not native, R. Ll. P.
- * **Geranium phœum**, Linn. — M. —
In a hedge near Mullaghmore lake, escaped, R. Ll. P.
- * **G. nodosum**, Linn. N. — —
On a hedge-bank by roadside near Linenhill House south of Armagh, quite naturalized, R. Ll. P.
- (* **G. perenne**, Huds. N. — —
"A few plants only on the roadside, by the hedge-bank, not far from a cottage a little north of Loughgall; not, I believe, wild here," More *N. H. R.* I could not find the plant at the spot indicated, and it was apparently an escape which did not maintain its hold).
- Radiola linoides**, Dc. N. — —
Abundant on a bog two miles south of Portadown, R. Ll. P.
- Ulex gallii**, Planch. — M. S.
Abundant on the southern mountains, and on the high ground around Carrigatuke and Deadman's Hill, in the centre of the county; absent from the northern bogs and the rest of Armagh, R. Ll. P.
- Trifolium medium**, Linn. N. — —
Very rare. Only observed at Navan Fort and the adjoining lake-let of Loughnashade, R. Ll. P.
- * **T. hybridum**, Linn. N. M. S.
In fields of grass and pastures occasionally throughout the county; R. Ll. P. Not considered a native in Britain.
- T. filiforme**, Linn. N. — —
One station only. Tynan Abbey, B.N.F.C., 1873 and 1889; also Herb. N. H. P. S. (S. A. S.)! The plant grows sparingly here on lawns near the house.

- ***Medicago sativa**, Linn. N. — —
Fields near Armagh, W. F. J. spec.! Field near Richhill, R. Ll. P. Introduced with grass-seed.
- [**Melilotus parviflora**, Desf. — — S.
Waste ground at Newry docks—a casual; R. Ll. P.]
- Anthyllis vulneraria**, Linn. N. — S.
Very local, but frequent by the estuary of the Newry river, and on limestone about Armagh, R. Ll. P.
- Lathyrus palustris**, Linn. N. — —
Islets in the Closet river (Lett), *Flor. N. E. I.*! I saw the plant in abundance on these islets, which lie where the river debouches into Lough Neagh, and also obtained it on the reedy banks of the stream half a mile from its mouth. More's note on Rev. G. Robinson's authority (*N. H. R.* and *Cyb. Hib.*) is a mistake: Scawdy Island in Tyrone is the spot intended; the plant formerly grew there, but is now extinct.
- †**Prunus cerasus**, Linn. N. M. S.
In field hedges about Loughgall, but not wild, More *N. H. R.*! In hedges, copses, and thickets throughout the county, as common or commoner than *P. avium*, and, although frequently planted, having equally the appearance of a native, R. Ll. P.
- ***Spiræa salicifolia**, Linn. — M. —
Abundant in hedges between Newtownhamilton and Ballymyre, but planted, R. Ll. P.
- Alchemilla vulgaris**, Linn., var. **minor**, Huds. N. — —
Near Tynan, B. N. F. C., 1889. Abundant on a lawn in Tynan Abbey demesne, R. Ll. P.
- Rubus plicatus**, W. and N. N. — —
Church Hill, R. Ll. P. "Perhaps best under var. *hemistemon*, P. J. Muell"—W. M. R.
- R. rhamnifolius**, W. and N. N. — —
Near Armagh, R. Ll. P.
- R. nemoralis**, P. J. Muell., var. **pulcherrimus**, Newm. ? N. M. —
My specimen was gathered, I think, in North Armagh; the label bearing locality was unfortunately lost. One of Mr. Lett's Ballymore *Rubi* belongs here also.
- R. villicaulis**, Koehl. N. M. S.
Ballymore, H. W. L. spec.! At Derryadd bay on Lough Neagh, and at Newry, R. Ll. P.
- R. lindleianus**, Lees. N. — —
Near Lurgan and Armagh, R. Ll. P.
- R. rusticanus**, Merc. N. M. S.
"Armagh; Prof. Oliver," *Cyb. Hib.* Perhaps the commonest bramble in the county, being abundant nearly everywhere. Specimens from Tartaraghan and Armagh were confirmed by Mr. Rogers.
- R. macrophyllus**, W. and N., var. **schlectendalii**, Weihe. — — S.
Near Newry, R. Ll. P. "Or between this and *R. macrophyllus*, W. and N. Panicle exceptionally weak."—W. M. R.
- R. salteri**, Bab. — — S.
Newry, R. Ll. P. "Probably best under *R. salteri*, Bab., though in that the leaves are usually less rounded and more deeply cut, and the fruiting sepals erect."—W. M. R.
- R. pyramidalis**, Kalt. N. M. —
Ballymore, H. W. L. spec.! Roadsides near Lurgan, R. Ll. P. "Armature of panicle-rachis unusually mixed."—W. M. R. Of another Lurgan specimen Mr. Rogers writes:—"Probably *R. pyramidalis*, Kalt., growing in sunshine."

- Rubus leucostachys**, Schleich. N. — —
Near Lurgan, R. Ll. P.
- R. mucronatus**, Blox. N. — —
Near Armagh, R. Ll. P.
- R. anglosaxonicus**, Gelert. N. — S.
Tartaraghan and Newry, R. Ll. P. Of the latter plant Mr. Rogers writes:—"Not a typical specimen," and of the former, "or between *R. anglosaxonicus* and *R. echinatus*; near my var. *raduloides*, vide Journ. Bot. 1892, p. 269."
- R. borrieri**, Bell-Salt. — — S.
Beside a rivulet by the Dundalk road, a mile from Newry, R. Ll. P. "True *R. borrieri*, Bell-Salt, beyond a doubt. I have before seen it only from Dorset and Somerset (abundant), Glost. and Wight, so this extension of it to Ireland is very interesting."—W. M. R.
- R. drejeri**, G. Jensen. — M. —
Ballymore, H. W. L. spec.! "Must go to *R. drejeri*, G. Jensen, I suspect, but that, *when typical*, has the leaves almost simply serrate and the sepals patent or clasping in fruit. In colouring, armature, etc., however, this just fits."—W. M. R.
- R. radula**, Weihe. — — S.
Ballymore, H. W. L. spec.! "Apparently."—W. M. R.
- R. scaber**, W. and N. N. — S.
Lurgan ("apparently the typical plant."—W. M. R.), Armagh ("?"—W. M. R.), and Newry ("apparently a strong form, with hirsute panicle and leaves softly hairy beneath."—W. M. R.), R. Ll. P.
- R. rosaceus**, Weihe. — M. —
Ballymore, H. W. L. spec.! "Apparently a *rosaceus* form, but not typical."—W. M. R.
- R. coryllifolius**, Sm. N. — —
Near Armagh, R. Ll. P. Apparently not so common in Co. Armagh as in Co. Down.
- R. coryllifolius**, Sm., var. **cyclophyllus**, Lindeb. N. — —
Tartaraghan, R. Ll. P.
- ***R. laciniatus**, Willd? N. — —
In a lane near Tartaraghan glebe, R. Ll. P. "A garden escape; I think the name has been given to divers laciniate-leaved forms."—W. M. R. This plant grows quite away from cultivation; I took it to be a wild sport of *R. rusticanus*.
- Rubus saxatilis**, Linn. S. — —
North side of Slieve Gullion at 1,500 feet, R. Ll. P.
- Geum intermedium**, Ehr. — — S.
Copses in the park at the Manor, Loughgall, accompanied as usual by *G. rivale* and *G. urbanum*, More N. H. R.
- G. rivale**, Linn. — — S.
Loughgall Manor, More N. H. R. Mullinure meadows and Loughnashade. W. F. J. spec.! Rare in Co. Armagh.
- Rosa spinosissima**, Linn. — M. —
Very rare in the county; observed in one spot only near Poyntzpass, R. Ll. P.
- R. mollissima**, Willd. N. — S.
Frequent on the limestone about Armagh, where I noted it in a number of spots; shore of Lough Ross near Crossmaglen, R. Ll. P.
- †**R. rubiginosa**, Linn. N. M. S.
Occurs mostly as stray bushes, and sometimes probably escaped, but apparently native on Lough Neagh shore. By Ulster canal

near English, and between Charlemont and Blackwatertown; shores of Lough Neagh west and south of Ardmore point; roadsides south of Markethill; by the canal below Newry, R. Ll. P.

R. arvensis, Huds. — M. —

Extremely rare; a single bush in the hedge by the roadside close to Scarva bridge, R. Ll. P.

Peplis portula, Linn. — M. S.

Rare. Shores of Camlough and Lough Ross; marsh at base of Carrigatuke, R. Ll. P.

***Epilobium angustifolium**, Linn. N. M. S.

Frequent in cottage gardens, and occasionally escaped. Perhaps originally a native.

Circæa alpina, Linn. N. — —

Shore of Lough Neagh south of Ardmore point, H. W. L. spec.!

Myriophyllum spicatum, Linn. N. — —

Frequent in the northern portion of the county; noted from near Lurgan, Portadown, Armagh, and in pools along the Lough Neagh shore, R. Ll. P.

†**Sedum telephium**, Linn. N. — —

Copse in Armagh Palace demesne, R. Ll. P.

***S. album**, Linn. N. M. —

Occasionally on old walls, etc., no doubt escaped, R. Ll. P.

***S. dasphyllum**, Linn.

Co. Armagh, *Flor. Ulst. Supp.*—an escape.

S. anglicum, Huds. — — S.

Very rare; rock at western base of Slieve Gullion, and rocks on a hill near Milltown chapel west of Camlough, R. Ll. P.

S. acre, Linn. N. — —

Near Navan Fort, W. F. J.! (only as an escape here, R. Ll. P.). Sandy banks by Lough Neagh west of Ardmore point, R. Ll. P.; this was the only native station I observed for this species; it is occasionally grown in cottage gardens.

***S. sexangulare**, Linn. N. — —

Sandy spots on Lough Neagh shore at Raughlan, H. W. L. spec.!

***S. reflexum**, Linn. N. M. S.

On limestone rocks by the Dungannon road three miles from Armagh; planted on cottage roofs in various parts of the county, R. Ll. P.

***S. rupestre**, Huds. — M. —

Old walls near Keady—escaped, R. Ll. P.

Saxifraga granulata, Linn. N. — —

Sparingly on the mound at Rathtrillick, near Middletown, B. N. F. C., 1873, and Herb. N. H. P. S. spec.!

Parnassia palustris, Linn. N. — —

"The parnassia, or grass of parnassus, a plant of extreme elegance and beauty, grows in the vicinity of Lough Neagh, and on the banks of the Tynan river,—*Cooté's Armagh*. Loughnashade and Mullinure meadows near Armagh, W. F. J. spec.!

Cicuta virosa, Linn. N. M. S.

Near foot of Blackwater (Templeton)! and shores of Lough Neagh (G. R.)! *Flor. Ulst.* Closet River, H. W. L. spec.! Several places along Lough Neagh shores from Lagan Canal to Maghery, in the Newry canal and pools near, at many spots between Portadown and Goragghwood, Mullaghmore Lough, Lough Gilly, R. Ll. P.

Apiumgraveolans, Linn. — — S.

By the river at Newry, and by the canal below Newry, R. Ll. P.

- Aplium inundatum**, Reich., var. **moorei**, Syme. N. — —
In the Blackwater at Maghery; near mouth of Closet River; and in a marsh near Morrow's Point in the S.E. corner of Lough Neagh, R. Ll. P. Confined to the Lough Neagh borders.
- ***Carum carui**, Linn. — — S.
Common on the G. N. railway for several miles south of Bessbrook; apparently naturalised here, R. Ll. P.
- Ceanothe fistulosa**, Linn. N. M. —
Moyntags bogs (Hyndman), and Armagh (G. R.), *Flor. Ulst.* Closet River, H. W. L. ! By Lough Neagh near Maghery, Milltown, and Lagan Canal, and abundant in Newry Canal between Portadown and Tanderagee, R. Ll. P.
- ***Peucedanum ostruthium**, Koch. N. M. S.
Roadsides and hedgebanks—no doubt introduced or escaped. Noted near Lough Gullion, Ballymyre, Camlough and Jonesborough, R. Ll. P.
- Torilis nodosa**, Gaert. N. — S.
Sparingly by the roadside at Drumintee chapel west of Jonesborough, and on bridge over the Bann on the borders of Down and Armagh, R. Ll. P.
- Chærophyllum temulum**, Linn. N. M. —
Dry hedgebanks, chiefly along the Lough Neagh shore. Close to Maghery ferry, roadside quarter mile east of Milltown, roadside a short distance S.W. of Ardmore church, in a lane by the main road at Derryadd Bay, and roadside south of Temple national school near Keady, R. Ll. P.
- †**Smyrniolum olusatrum** Linn. N. — S.
Near Loughall, but, as in most of its habitats, liable to suspicion, More *N. H. R.* ! Ardmore Glebe, H. W. L. ! Near Newry, very rare in the county, R. Ll. P.
- ***Myrrhis odorata**, Linn. N. M. S.
Tanderagee (G. R.), *Flor. Ulst.* Roadsides near Eglish church, at base of Camlough mountain, and at Ballymyre, R. Ll. P.
- (***Cornus sanguinea**, Linn.
On a small islet in the Loughgall lake, More *N. H. R.* Is not there now, and as it does not grow elsewhere in the county, I have no doubt it was planted, R. Ll. P.)
- †**Sambucus ebulus**, Linn. N. — —
About the ruins of an old building close to Lough Neagh, More *N. H. R.* Armagh (G. R.), *Flor. Ulst.* Near Eglish church, and roadside east side of Loughgall demesne, R. Ll. P.
- Galium boreale**, Linn. N. — —
Lough Neagh shore only. Banks of Lough Neagh, More *N. H. R.* ! Ardmore Glebe, H. W. L. ! Bird Island, R. Ll. P.
- G. mollugo**, Linn. N. M. —
Near Armagh, W. F. J. spec. ! In several places in Tanderagee upper demesne, R. Ll. P.
- Valerianella dentata**, Poll. N. — S.
Corn-field between Armagh and Loughgall, W. F. J. spec. ! Gravel-pit east of Grange, near Armagh; fields near Beech Hill House, Armagh; fields east of Middletown, and at Lough Ross near Crossmaglen; and on the Warrenpoint railway below Newry, R. Ll. P.
- Eupatorium cannabinum**, Linn. N. — —
Loughgall manor grounds, by the lake, W. F. J. !
- Astertripolium**, Linn. — — S.
Estuary of Newry river; abundant and luxuriant by the stream in the town of Newry, growing in groves four feet high, R. Ll. P.

- Solidago virgaurea**, Linn. — — S.
Sparingly on Slieve Gullion, R. Ll. P.
- ‡**Inula helenium**, Linn. N. — S.
Derryadd, H. W. L. spec.! In a lane west of Goraghwood, R. Ll. P.
- Filago germanica**, Linn. N. — S.
Shore of Lough Neagh at Raughlan, H. W. L. spec.! On a ruined cottage at the western base of Slieve Gullion, R. Ll. P.
- F. minima**, Fries. N. — —
Sandy ground near Lough Neagh, More *N. H. R.* Shore of Lough Neagh at Raughlan, H. W. L. spec.! Sandy shore of Lough Neagh near Charlestown, R. Ll. P.
- Gnaphalium sylvaticum**, Linn. N. — S.
Derryadd, H. W. L. spec.! Frequent among the hills south of Newry, R. Ll. P.
- Antennaria dioica**, Gaert. N. — —
Raughlan Point and Croaghan Island, Lough Neagh, H. W. L. spec.! Stony Hill near Retreat N.E. of Armagh, R. Ll. P.
- Anthemis nobilis**, Linn. N. — —
Near Maghery, W. F. J. spec.! Near Tartaraghan Church, but cultivated, R. Ll. P.
- Matricaria inodora**, Linn., var. **salina**, Bab. — — S.
Estuary of Newry River, R. Ll. P.
- ‡**M. chamomilla**, Linn. N. — S.
Roadside at Woodview post-office near Richhill, and on railway at Newry, R. Ll. P.
- ***M. parthenium**, Linn. N. — S.
Near houses, escaped. Tartaraghan, S. A. S. Portadown and Newry, R. Ll. P.
- ***Doronicum pardallanches**, Linn. N. — —
Roadside near Tynan, B. N. F. C. 1889. Roadside from Armagh to Tynan, W. F. J. spec.! Roadside between Tynan and Middletown, R. Ll. P. Apparently naturalised about Tynan.
- ‡**Tanacetum vulgare**, Linn. N. — S.
"If a stubble-field should be left a year in cashier fallow, which is very seldom the case, the crowfoot and tansy soon overspread it, and are very difficult to be eradicated," *Cooté's Armagh*. Derryadd Bay, H. W. L.! Near Loughgall, Blackwatertown, Charlemont, Portadown, and Camlough, but not having the appearance of a native, R. Ll. P.
- Senecio sylvaticus**, Linn. N. — —
Ardmore, H. W. L. spec.! On the Lough Neagh shore, at Maghery, Milltown, and Charlestown; on bog east of Lough Gullion; by Dungannon road three miles from Portadown, R. Ll. P.
- ***S. saracenicus**, Linn. — M. —
Banks of a stream $1\frac{1}{2}$ mile N.W. of Keady—an escape, R. Ll. P.
- Bidens tripartita**, Linn. N. M. —
Armagh (G. R.), *Flor. Ulst.* Lough Neagh shore, west of Bannmouth; bogs by Bann below Portadown; shores of Lough Gullion, Marlacoo Lake, Ballynewry Lake, and Mullaghmore Lake, R. Ll. P.
- B. cernua**, Linn. N. M. S.
Armagh (G. R.), *Flor. Ulst.* Canal at Portadown, S. A. S.. Mullinure meadows, and Maghery, W. F. J. spec.! Ardmore, H. W. L. spec.! Frequent on the northern bogs; shores of Portnelligan and Mullaghmore Lakes; canal near Tanderagee; bog south of Portadown, and bog near Forkill, R. Ll. P.
- Arctium nemorosum**, Lej. N. — —
Near Tynan, B. N. F. C. 1889. Near Navan Fort, R. Ll. P. Mr.

Bennett writes of my specimen "*A. nemorosum* Bab. non Lej; the plant *Babington* names as *nemorosum* (= your plant!) is not the *A. intermedium* Lange, with which Lange says *A. nemorosum*, Lej. is synonymous."

Arctium majus, Schk. N. — —
Roadside two miles east of Loughall, R. Ll. P. (*vide* A. Bennett).

[**Centaurea scabiosa**, Linn.

In County of Armagh, *Flor. Ulst. Supp.* A mistake.]

Carduus crispus, var. **acanthoides**, inn. N. — —

Common in the limestone district, and occasionally on the New Red Sandstone; absent from the rest of the county, R. Ll. P.

C. pratensis, Huds. — — S.

Sparingly on the N.W. slope of Camlough mountain, R. Ll. P.

***Silybum marianum**, Gaert.

In small enclosures, waste ground, etc., always near buildings, More *N. H. R.* Maghery, W. F. J. ! Seagoe, H. W. L. spec. !

Leontodon hirtus, Linn. N. — —

Frequent in the northern portion of the county, on boggy and wet gravelly ground; noted from Loughadian near Armagh, lakeside at Loughgall, shore of Derrylileagh Lake, bog two miles south of Portadown, gravel pit two and a-half miles N.E. of Armagh, and abundant on a stony hill near Retreat between Armagh and Richhill, R. Ll. P.

†**Crepis biennis**, Linn. N. — —

Abundant in a field at Armagh workhouse, about 1886, A. G. More *in litt.* I found it growing plentifully on the lawn of the Shiels Memorial Buildings, adjoining the workhouse, which is no doubt Mr. More's station; it does not appear to have spread. Introduced with seed?

C. paludosa, Moench. — M. S.

Observed at one or two spots in the centre and south of the county, but rare, R. Ll. P.

***C. nicæensis**, Balb. N. — —

Sparingly on railroad track south of Drummanmore Lake, near Armagh, R. Ll. P. The specimens were poor and apparently not characteristic. Mr. Hanbury writes of my plant "I have little doubt but that it is *C. nicæensis*, Balb.; it agrees well with my specimens." Mr. Bennett says: "Your plant differs from typical *nicæensis* by the want of pubescence on the stems, etc., which is sometimes very marked, but I suppose it must go to it." This is a S. European species, and was probably introduced with grass seed; it has not been previously detected in Ireland, so far as I am aware.

Lobelia dortmanna, Linn. N. — S.

Junction of Lagan canal and Lough Neagh (Hyndman) *Flor. Ulst.*; this is on the borders of Armagh and Down. In Lough Neagh at west side Raughlan Point! and shores of Derrylileagh Lake, H. W. L. In Lough Neagh north of Bird Island, and abundant at the east end of Lough Ross, near Crossmaglen, R. Ll. P.

Jasione montana, Linn. — — S.

Abundant in the southern hill district; not seen elsewhere, R. Ll. P.

Campanula rotundifolia, Linn. — M. S.

Centre and south of the county; not common, R. Ll. P.

Andromeda polifolia, Linn. N. — —

Bogs in Armagh (G. R.), *Flor. Ulst.* Tartaraghan (G. R.), *Cyb. Hib.* "Bog near Tartaraghan, Rev. G. Robinson, spec.!" More *N. H. R.* Must be very rare; I passed over miles of likely ground without seeing it.

Vaccinium vitis-idaea, Linn.

N. — S.

At south end of Lough Neagh (Templeton), *Flor. Ulst.* Summit of Slieve Gullion (1,893 feet), and for several hundred feet downwards, R. Ll. P. The Loughgall record of *Flor. Ulst.* was an error; *V. oxycoccus* was the plant, and Tartaraghan the station intended. I did not succeed in refinding this plant on the northern bogs, although I kept a look-out for it, in view of Mr. More's recent remarks in *Journal of Botany* (1892, p. 88); these bogs lie at an elevation of only fifty to one hundred feet, but to judge from the presence on them of such mountain plants as *Listera cordata* and *Lycopodium selago*, the occurrence of *V. vitis-idaea* does not appear unlikely.

V. oxycoccus, Linn.

N. — —

Bog near Tartaraghan, More *N. H. R.* Bog at Annaghmore (G. R.), *Flor. Ulst.* Bog between Annaghmore and Maghera, B. N. F. C. 1871. Wet bog, Annaghmore (S. A. S.), Herb. N. H. P. S. Montiaghs bogs, H. W. L. spec.! Abundant on bogs south of Annagarriff Lake, north of Lough Gullion, and near Ardmore Point, sometimes forming a dense mat on quite dry turf, R. Ll. P.

***Ligustrum vulgare**, Linn.

N. M. —

Common near Armagh, W. F. J. spec! Occasionally in wild-looking stations, but no doubt escaped, R. Ll. P.

Convulvulus arvensis, Linn.

N. — S.

County Armagh (G. R.), *Flor. Ulst.* Mullinure near Armagh, W. F. J. spec.! Lanes west of Armagh, railway near Richhill, roadside near Loughgall, and rather common in the Newry neighbourhood, R. Ll. P.

C. sepium, Linn., grows abundantly in the Closet river in one to two feet of water, twining up the stems of *Scirpus lacustris*, among such plants as *Nuphar*, *Armoracia*, and *Cicuta*. I do not find any notice of this aquatic habit in the text-books.***Anchusa sempervirens**, Linn.

— M. —

Tanderagee, *Flor. Ulst. Supp.*

Lithospermum officinale, Linn.

N. — S.

In hedge banks in several places near Loughgall, but sparingly, More *N. H. R.*! Where I observed it was on roadside between Loughgall and Richhill, R. Ll. P. Grange near Armagh, W. F. J. spec.! Ruins of Killeavy church near Slieve Gullion, H. W. L. spec.!

L. arvense, Linn.

N. — —

Tartaraghan, in cultivated ground, More *N. H. R.*

Myosotis repens, Don.

— — S.

Abundant in the southern hill district; absent from the rest of the country. The distribution of *M. palustris* is just the reverse of this, that species being abundant on the northern bogs, and by the low-lying lakes, streams, and canals of the north and centre of the county, and extremely rare in the south, R. Ll. P.

Solanum dulcamara, Linn.

N. — —

Shores of Lurgan lake, H. W. L. spec.! Armagh Palace demesne, R. Ll. P. Frequently grown in cottage gardens.

Hyoscyamus niger, Linn.

N. — —

Near Armagh Cathedral (Thompson), *Flor. Ulst.* Not seen recently, but is a very uncertain plant.

Lathræa squamaria, Linn.

Armagh (G. R.), *Flor. Ulst.*; this record refers to the succeeding station. In a small copse within the park at Loughgall manor, More *N. H. R.*, and subsequently, G. R.

(TO BE CONTINUED.)

THE MAGNESIAN LIMESTONE OF THE CORK DISTRICT.

BY THOMAS FARRINGTON, M.A., F.C.S., F.I.C.

[Read before the Cork Naturalists' Field Club, March 15th, 1893.]

THE beds of dolomite, or magnesian limestone, existing in the neighbourhood of Cork, though inextensive, are not alone important in connection with our local manufacturing industries, but as having also considerable interest from a geological point of view. Almost the whole surface of the county is occupied by the various subdivisions of two formations, viz., the Old Red Sandstone and the Carboniferous limestone; anything, therefore, that opens the door for a wider study of the science ought to be welcome to its students here.

The presence of dolomite, in association with the Cork limestone, has been somewhat of a puzzle to geologists, and one eminent exponent of the science, Professor Harkness, has attributed its origin to the action of sea-water upon the ordinary limestone. In a paper on "Jointing," read before the Geological Society of London, June 9th, 1858, he says:—

"The mode in which the magnesian limestones make their appearance in the district under review leads to the inference, that the dolomites were not deposited by the ordinary action of water as sedimentary rocks, but that they are superinduced structures, which have not only arisen from the action of forces operating subsequent to the deposition and consolidation of the limestones in which they occur, but have had their origin after the operation of that force which has produced joints among these limestone strata."¹

The object of the present communication is to adduce some facts which seem inconsistent with a portion of this statement, and to bring forward another theory which seems to accord better with all the facts of the case. As the greater part of the above quotation fits in as well with this latter theory as with the Professor's own, the only portion of it directly traversed is that which asserts "that the dolomites were not deposited by the ordinary action of water as sedimentary rocks, but that they are superinduced structures." So far from confirming this view, my observations have led me to an opposite con-

¹ *Quarterly Journal Geol. Soc. London*, vol. xv. (1859), p. 100.

clusion, viz., *that the dolomites of this district, instead of being superinduced structures, are the remnants of sedimentary rocks of the Permian formation, resting unconformably on the denuded, fissured, and excavated limestone.*

The principal grounds on which this opinion is based are as follows:—

1. The dolomitic bands which have come under my notice have a general east and west direction; this is such an evident fact, that it has been customary, in connection with the magnesia manufacture, to search for the rock in a direct line east or west of the points at which it had been previously found.

2. These deposits invariably show at the top surface of the rock-formation, either overlying the limestone, or being wedged in between masses of that rock which also show at the surface on either side of them.

3. Though in many cases they penetrate the limestone for a considerable depth, there is a general diminution of breadth downwards, the horizontal section meanwhile widening or narrowing in an irregular manner. Figure 1, *a* shows the

Fig. 1

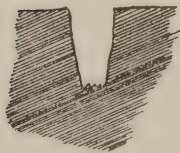
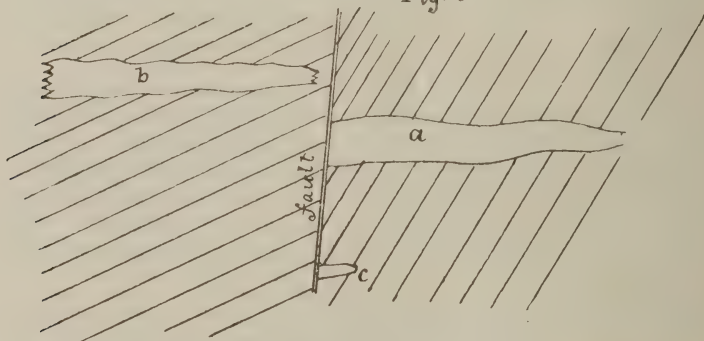


Fig. 3

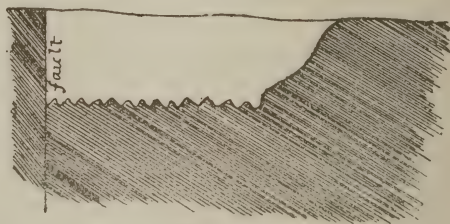


Fig. 2

plan, or horizontal section; *fig. 2*, the longitudinal section; and *fig. 3*, the cross section of a small quarry which was

worked for the "Magnesia-stone" only, the space left by the stone removed consequently representing the original dolomitic deposit.

4. The upper surface of both the limestone and dolomite is found to be eroded by the action of water or ice, and is often covered by deposits containing sand, gravel, or rounded stones. I have obtained a sample of gravel from over a long band which was found to the westward of the fault, but not in line with it (*fig. 1, b*); it has not yet been ascertained whether this is a continuation of the aforementioned strip (*a*) or no; at present it seems more in character with another (*c*) which runs parallel a short distance to the south.

5. The line of demarcation between the magnesia and limestone when found in juxtaposition is always sharp; even when the minerals are nearly of the same colour and general appearance, it is plain to a practised eye; and while they often adhere, so that a hand-specimen containing both may be obtained, they, on the other hand, can in general be readily separated at the surface of junction.

The following analyses of samples taken from the same stone, not a yard apart, will illustrate the great difference of composition between rocks which an ordinary observer would take to be identical:—

	Dolomite.	Limestone.
Foreign matter,	.. 2.5	1.7 per cent.
Magnesium carbonate,	.. 42.9	1.7 „
Specific gravity,	.. 2.83	2.71 „

6. The dolomite is generally less pure than the limestone. This point is also shown by the above analysis (although the sample of dolomite is an exceptionally pure one), there being nearly fifty per cent. more foreign matter present in the latter than in the sample of limestone. In many cases the amount of foreign matter is much greater, and often there is so much iron present as to produce a very dark-coloured stone.

7. In the cavity left by the removal of the band of dolomite last mentioned (*fig. 1, c*), there appear adhering to the limestone on each side, slaty scales—some light-coloured and some of darker colour, and greasy to the touch,—which will probably repay a careful examination. Apart, however, from their composition, they form a strong link in the chain of evidence which goes to prove that the magnesia-stone was

deposited in its present position, and that the latter is not the result of the tilting-up of strata originally horizontal.

In addition to denudation, it seems as if the strata had been subjected to a degree of heat sufficient to weld them together without such fusion as would completely destroy the previous arrangement of their parts. The presence of large crystals of iron pyrites in the magnesia-stone seems to favour this view, as also its crystalline structure. Prof. M. M. Hartog, of Queen's College, Cork, who has kindly examined for me a mounted section of the minerals in juxta-position, says the dolomite is in the form of saccharine marble, while the limestone is not nearly so much metamorphosed.

To ascertain the character of the organic remains will, no doubt, help much in elucidating the question of the common or distinct origin of these rocks. This is, however, rendered somewhat difficult by the consideration just alluded to, and it is only rarely that distinct fossils are obtained from the dolomite-bearing limestone of the district. In only one or two cases have I found signs of life in the dolomite—viz., some small crinoids, and some tiny shells in a few weathered specimens. More distinct and larger fossils may be found in the pure limestone, but not to anything like the extent that obtains in other parts, the Little Island quarries for instance. Judging from these limited materials, the palæontological evidence is not adverse to my theory, but it can hardly be of much value until a closer examination has been made.

The theory of the origin of these deposits to which the foregoing among other facts have led me, may be briefly stated as follows:—After the deposition of the Old Red Sandstone, the Carboniferous limestone, and the Coal Measures, these strata were distorted by terrestrial disturbance, and thrown into the succession of parallel hills and valleys which we find now forming an important feature of our southern Irish scenery. A period of denudation then set in which cleared away nearly all the Coal-Measures, carried off the limestone from the hill-tops, and exposed the Old Red Sandstone over most of the countryside.

As the result of upheaval, long cracks and fissures may have been formed in the limestone, in a direction parallel to the lines of hills, *i.e.*, east and west, or rapid streams running down the valleys, and possibly charged with solvents, may have

made deep channels in this soft and easily-solved rock. Then succeeded the so-called Permian period, with its lagoons of concentrated sea-water, from which the dolomite was deposited over the limestone still remaining, and also down deep in the parallel cracks which scored its surface. Later on, another period of denudation ensued, viz., the Glacial epoch, which has left such enduring marks upon the geological features of the district, and the soft Permian strata were all cleared away, with the exception of that portion deposited in the limestone fissures, and which, under the name of the Magnesian Limestone of the Cork District, forms the subject of these notes.¹

THE COLEOPTERIST IN IRELAND.

BY W. E. SHARP.

DUBLIN COUNTY—NORTH COAST.

To the present writer, whose misfortune it is to be a native of the larger of the islands of the United Kingdom, Ireland had always seemed, viewed from an entomological stand-point, to be a land not so much of definite promise as of vague possibilities. In earlier days we had no authentic list of Irish Coleoptera (a want, now how well supplied as regards the north, by the Rev. W. F. Johnson, the readers of this serial know). What might be discovered in a land which cultivation had so little altered—a land of undrained bogs, wild, rough mountains, lakes, and moors, and wildernesses, and one withal of so singularly mild and equable a temperature—it was impossible to conjecture. There were the theorists, who suggested that the remnants of that arctic, or glacial fauna, restricted in England to the highest altitudes, whose places had been occupied by newer races from the Continent, adapted to a more temperate era, had been driven ever westward by that incursion from the east, and might even now be found, perhaps, more abundantly in the west of Ireland than anywhere on this side the channel. Then there was that idea of a former land-

¹ Since the above theory was conceived, it has received confirmation, by the discovery that the observations of others in the North of Ireland had led them to the conclusion that Permian beds existed there also. See Hull's *Phys. Geol. and Geog. of Ireland*, second edition, pp. 67-70.

connection between Kerry and the Spanish peninsula, to which the occurrence of the spotted slug, *Geomalacus maculosus*, among the rocks of the south-west, gave some colour; and our imagination was fired by the fancy of ancient Iberian forms still lingering on among the sheltered valleys of the Kerry hills, or sporadic among the islands that fringe that tumultuous coast. Thus Ireland, to the young and imaginative coleopterist, became an enchanted island, where might lie buried unheard of rarities, archaic types of the days of the retreating ice—species new to Britain, or even, exciting thought, new to science, and only describable in the most formal Latin. Nor, indeed, are such dreams even now proved to be of the ivory gate. It is true we have in the north and east of Ireland observers who are unlikely to leave much undiscovered. We have also many records from Cork and Waterford by the late Dr. Power; but all the extreme south, and the best part of the west, and the region of the midland bogs, are still virtually a *terra incognita*, and among these mountains and fens, doubtless there still lies hid much worth the capture.

After this exordium, we fear the reader will experience some disappointment in discovering that the following notes chronicle no exploration into these wilds, but merely a simple walk along the northern coast of Dublin county, and that of the species captured on that occasion, not one can, by any stretch of credulity, be called rare, and that nearly all are probably well known as occurring in Ireland as well as in England.

Not far southward from the town of Drogheda are certain islets called by the generic term of Skerries, and hard by, on the mainland, is a village, perhaps more properly a town, of the same name. The derivation of this word seems interesting, and we hazily conjecture that it may possibly be akin to Skelligs, as similar rocks on the west coast seem to be called. The point, however, is undetermined, and the town of Skerries not particularly interesting. On this bright, windy, May morning we are glad to get free from its long rows of white cottages, and strike the beach at the south end of the town. The shore here is shingly high up, rocky lower down, and a low cliff terminates the cultivated land beyond. If you are a geologist, you may notice there exposed a section of drift, sandy or gravelly in

some places, and you may see, in scratched stones and pebbles, tokens of the long since melted ice.

But being more especially of the coleopterist's cult, a dead gull on the shore proves more attractive, and we proceed to investigate the corpse. Alas, it is but a skeleton, and tenanted apparently only by multitudes of a species of *Homalium*, that the long elytra and shining chesnut colour at once declare; but the species is another matter, so we convey a few of them to the laurel-bottle for further examination with a lens. Now, it is this delightful uncertainty which lends such a fascination to the coleopterist's outdoor work. So many of the species are so minute and so obscure, that not even the most experienced veteran can feel absolutely sure what *Homalota*, *Homalium*, *Atomaria*, or *Trichopteryx* he may have got. Probably patient investigation will ultimately disappoint our hopes, and resolve our unknown into the commonest of the genus; but there is always the chance of the prize, and although this uncertainty entails a vast amount of superfluous labour in securing almost everything small from likely localities, yet it invests them all with the interest of their possible value. So it was with these *Homalia* shaken out of this skeleton sea-fowl; they looked good, but they turned out nothing better than *H. rivulare*, probably the most frequent member of the group.

Strewn about among the shingle are bunches of tangled, sand-coloured seaweeds, and moister olive-green masses; beneath the former we find a small *Alcochara*, ashy-grey, instead of shining like the so common *A. languinosa*, and this proved to be *A. algarum*, a species of exclusively maritime habits; we also found a few specimens of *Cercyon littoralis*, a form which a beginner might readily mistake for *C. hæmorrhoidalis*, the most plentiful of this group, but besides the completely different habitat, if the two insects are held up on a level with the eye, so that one can view their contour in profile, this *C. littoralis* is at once distinguished by its flattened back as contrasted with the boldly convex profile of *C. hæmorrhoidalis*.

Under the heavier and wetter masses were great numbers of *Cafius xantholoma* and *C. fucicola*, the latter rather a rare, or at any rate, a local insect. All the members of this genus of *Cafius* inhabit seashores and the margins of tidal rivers, and, indeed, seem to be met with nowhere else. There is a

peculiar look about these insects which renders them unmistakable after being once seen. Probably their food consists of the small, or immature sandhoppers, which rise up in a cloud from beneath these masses of tangled *Fucus* when they are moved.

Proceeding onward along the shore, we cannot but notice those unfamiliar rocks which run out in points and masses opposite Lambay island. Had we at that time read Professor Cole's series of articles which have appeared in *The Irish Naturalist*, in "Co. Dublin Past and Present," we should have examined these rocks with more curiosity, and looked out for some of the silicified fossils, the brachiopods, gastropods, and the rest, which the Professor describes as occurring along this part of the coast; as it was, with undiscerning eye, and to avoid the wet and contorted surface which those interesting Ordovicians present, we left the actual beach, and mounting the low cliff, continued our way by a path through the meadows which there border the shore. Scattered along by the side of this track were many boulders and fragments of stone. These being inverted, disclosed a few beetles, mostly, however, valueless. There were the common *Philonthus varius*, *P. politus* and *P. marginatus*; a *Quedius* or two, such as *Q. tristis* and *Q. molochinus*; *Lathrobium fulvipenne*, and *Xantholinus linearis*. These one finds everywhere, but this shining brown *Silpha*, which tumbles into the cavity exposed by the uplifting of one of our stones, one does not find everywhere. In fact, this is the first insect which tells us that we are in Ireland, and nowhere else. The thing is generally described as a variety of *Silpha atrata*, under the name *subrotundata*, and to the present writer is a beetle of considerable interest. It differs so materially from the type-form common in England, that there seems no good reason to deny to it the rank of a separate species. That is to say, the two differ not only in colour (which is comparatively unimportant), but also in structure, and there are among the Geodephaga many differences apparently smaller and less distinct, which are held to divide true species, such are *Notiophilus biguttatus* and *N. substriatus*, *Nebria brevicollis*, and *N. gyllenhali*, *Bembidium tibiale* and *B. atrocæruleum*. Again, there are no connecting links so far in evidence between *S. atrata* and *S. subrotundata*, although, perhaps, the var. *brunnea*, found amongst the Welsh

hills, might suggest a common origin; but *brunnea* does not differ in *structure* at all from *atrata*, while this *subrotundata* does. Of course, we all know how difficult—nay, impossible, it is, accurately to define what we mean by “a species,” and whether we call any particular form a species, or a racial variety matters but little; the really interesting point about this oily-looking light-brown *Silpha*, which lies kicking in our laurel bottle, is, that the form is almost exclusively restricted to Ireland and the Isle of Man. There are a few, possibly doubtful, English records, as the form *brunnea* might easily have been mistaken for it; whether the type-form has ever been taken in Ireland we cannot say,¹ but if it had never been discovered, that is no proof that it does not exist there; but whether it exists or not, roughly speaking, *S. atrata* is the English, and *S. subrotundata*, the Irish form, and the question at once arises—why should this be? Has the insect been differentiated since the complete disruption of Ireland from Great Britain? or was *S. subrotundata* the original form which in England has been supplanted, and, indeed, exterminated by a younger rival, *S. atrata*? And where does our mountain *S. brunnea* come in? Can that be older than either of the other two, or have all three been synchronously differentiated? Such are some of the problems which this small beetle suggests. It may possibly also occur to us that this insect is rather a stumbling-block in the way of current theories of melanism. Upland forms being presumably relics of the age of the passing glaciers, ought according to such theories to be black, or at least, darker than exclusively lowland forms; and many Geodephaga, such as *Carabus arvensis*, *Notiophilus aquaticus* and *N. palustris*, and *Calathus melanocephalus*, by their melanic alpine variation are consistent evidences of such a principle, but here we have a beetle whose lowland form is black, and upland (*brunnea*) form pale! Such questions as these can only be answered by careful record of the occurrence of the particular species we may be investigating, its varieties, and allied species, over the whole Palæ-arctic zone, and such records seem at present too fragmentary and indefinite to be of much service, while such as do exist

¹ Both *Silpha atrata* (type), and its variety *brunnea*, occur in Ireland. It is worthy of remark that *S. subrotundata*, though generally brown, is sometimes black.—Eds.

are too often inaccessible to the ordinary student. With our present knowledge, questions such as these are clearly insoluble, and so having taken a sufficient number of this engaging insect (and they seem rather plentiful under these stones), let us note some of the other species which occur there.

(TO BE CONCLUDED.)

REVIEWS.

An Account of British Flies (Diptera). By F. V. THEOBALD, M.A., F.E.S. Vol. i. London: Elliot Stock, 1892. 10s.

This is the first volume of a work which will be valuable to students of this most difficult order of insects. It contains chapters on fossil Diptera, the classification of the families of the order, and descriptions of the British genera and species of the *Pulicidæ* (Fleas), *Cecidomyidæ* (Gall-Gnats), *Mycetophilidæ* (Fungus-Gnats), *Bibionidæ*, *Simuliidæ*, and *Chironomidæ* (Midges). There is often great difficulty in determining what species really occur in Britain; Mr. Theobald has given to the commoner and certain species the longest descriptions. Tables of genera and their species are given in some families but not in all; the localities in which species occur are rarely indicated. The larval and pupal stages of the flies are, however, dealt with fully; the book in this respect contrasts most favourably with many entomological works, whose authors consider the perfect insect alone worth consideration. Agriculturalists will be interested to know that species which injure crops are described in special detail.

In the earlier decades of the century, the great Irish naturalist, Haliday, was a pioneer in the study of Diptera. We hope that some of our present-day entomologists may be induced to work at this obscure but most interesting order.

Blue, White, and Blue. Edited by JOHN CHARLES BENSON. Vol. ix., No 1. Dublin, February, 1893. 6d.

We have received the current number of the Rathmines School Magazine, and note with pleasure the prominence given to natural history subjects.

There are some interesting "Bird Notes" by the head master, Rev. Dr C. W. Benson, and we believe that the record of our latest visitor, the Serin Finch, appeared earlier here than in any other journal. In an article on "Dublin in 1805," there is a reference to the introduction of the Frog, and the writer evidently agrees with Mr. Kane rather than with Dr. Scharff. We are a little surprised to read, in an article on the Bailey Lighthouse, of the Sugarloaf and "its volcanic glories of a bygone age." We thought it generally known that this mountain is not an extinct volcano, and that its conical shape is due to the even weathering of the quartzite of which it is composed.

It is gratifying to know that a taste for observing natural objects is being so well developed in Rathmines School, and we confidently look for new recruits from its pupils to the ranks of Irish naturalists.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a Sparrow-Hawk from Master Phillips; two gulls from A. M. Harper, Esq.; a Guinea-Fowl from Mr. Brady; a Golden-headed Marmoset from Miss S. Roberts; and some freshwater fish from A. Godden, Esq. A Bactrian (two-humped) Camel, an Axis Deer, and a Nylghaie, have been purchased.
7,500 persons visited the Gardens in March.

ARMAGH NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

MARCH 20th.—The President (REV. W. F. JOHNSON, M.A., F.E.S.) in the chair. MR. R. LLOYD PRAEGER, M.R.I.A., delivered a lecture on "Botanical Rambles in Co. Armagh." The results of Mr. Praeger's investigations are at present appearing in these pages.

BELFAST NATURALISTS' FIELD CLUB.

MARCH 21st.—The President (MR. JOHN VINYCOMB) in the chair. The evening was devoted to a display of microscopical objects and apparatus. This being the second Annual Meeting of the Microscopical Section, the Secretary (MR. H. MCLEERY) presented the report of the section, which was adopted. The microscopes then claimed attention. The exhibitors were—Miss C. M. Patterson, Messrs. J. J. Andrew, S. Cunningham, Henry Davis, W. D. Donnan, Wm. Gray, M.R.I.A.; P. F. Gulbransen, W. Hanna, B.A.; Adam Speers, B.Sc.; Alex. Tate, C.E.; R. Welch and Joseph Wright, F.G.S. At nine o'clock a short business meeting was held, at which a number of new members were elected.

APRIL 5th.—The President in the chair. The evening was devoted to Irish folk-lore. The following papers were read:—"Pishogues from Tipperary," MISS LILY S. MOLLAN; "A Notice of Irish Fairies," MR. W. H. PATTERSON, M.R.I.A.; "Notes from Co. Down," MRS. BLAIR.

DUBLIN NATURALISTS' FIELD CLUB.

MARCH 21st.—The REV. MAXWELL CLOSE, M.A., in the chair. DR. VALENTINE BALL, C.B., F.R.S., gave a lecture entitled, "Notes on some Animals and Plants observed in the Valley of the Nile." Having described the natural features of the country, its geology, climate, and irrigation, and illustrated his remarks by means of limelight photographs, which included many views of architectural ruins and animal life in the Nile Valley, Dr. Ball referred to the influence which the inroad of the Camel has had on the nature of the soil in destroying the herbage, and rendering the land a desert. He then alluded to the customs of the ancient Egyptians, and showed how certain animals, such as the Ibis and the Cat were worshipped, only by certain sections of the people—one creature being held sacred in one region, and another in a different one. The Chairman having thanked Dr. Ball for his lecture, discussed several points of the geology of Egypt, and then spoke of the worship of the ancient Egyptian peoples, showing that it is very probable that they possessed other obscure religious ideas than those commonly credited to them.

MR. H. LYSTER JAMESON exhibited a variety of the Swallow (*Hirundo rustica*) as an example of albinism.

MR. D. M'ARDLE exhibited specimens of *Saracenia flava maxima*, a hybrid, being the first production of this variety in Ireland, and having been grown in the Glasnevin gardens.

MR. DUERDEN exhibited a mounted specimen of *Crisia ramosa*, Harmer, a polyzoon new to Ireland, from Dublin bay; the species has recently been described by Mr. S. F. Harmer, who obtained it abundantly at Plymouth.

APRIL, 11th.—The President (DR. M'WEENEY) in the chair. MR. H. K. G. CUTHBERT read a paper on "Some Destructive Weevils," giving an account, illustrated by lantern diagrams, of the more important species of Weevils which injure garden plants, fruit and timber trees, and stored grain. The President, Mr. G. H. Carpenter, and Mr. J. M. Browne, took part in the discussion.

MR. H. LYSTER JAMESON read a paper on "Some Coleoptera from Loughgilly, Co. Armagh," and exhibited specimens in illustration thereof.

MR. J. N. HALBERT exhibited *Hæmonia appendiculata*, a chrysomelid beetle new to Ireland (see note, p. 148) from the Royal Canal.

DR. M'WEENEY exhibited a fungus, *Cordyceps entomorrhiza*, new to Ireland, from Woodenbridge, Co. Wicklow. This remarkable fungus was growing on the two-winged fly *Polyetes lardaria*.

REV. M. H. CLOSE showed a piece of coal with fracture-planes resembling the faces of a rhomboidal crystal.

NOTES.

BOTANY.

FUNGI.

Fungi from Woodenbridge, Co. Wicklow.—In company with Dr. Scharff I spent several hours collecting in the above locality during the Easter vacation. The following is a list of the chief species met with. They would doubtless have been much more numerous had the weather not been continuously dry for nearly a month previous to our excursion, dryness being, as is well known, unfavourable to the development of most Fungi:—

Three agarics, all belonging to the indistinct purple-spored groups, *Psilocybe* and *Psathyra*. As there was only a single specimen of each species to be found, complete identification was quite impossible; *Polyporus armeniacus*, Berk., or some closely-allied species, on dead fir-trunk; *Dædalia quercina*, Fr.; *Stereum hirsutum*, Fr.; *Peronospora pygmaea*, Ung., and *Urocystis anemones*, Pers., both abundant on *A. nemorosa*, which was very plentiful along the banks of the Aughrim river; the two parasites sometimes occurred in company, the epidermis raised up and blistered by the *Urocystis*, being covered with a thin grey coating of *Peronospora*; sections through these places showed the oospores of the *Peronospora* lying in the parenchyma-cells close to where the spore-groups of the *Urocystis* were in process of differentiation; *Uromyces poæ*, Rabh., æcidiospores everywhere abundant on *Ranunculus ficaria*; *Puccinia phalaridis*, Plow., æcidiospores and pycnids on *Arum maculatum* (scarce); *P. glomerata*, Grev. on *Senecio jacobæa*; *Peziza stercorea*, Fr., and *Ascobolus furfuraceus*, Pers., on cowdung; *Reticularia umbrina*, Fr.; *Arcyria cinerea*, Schum.; *Rhizisma acerinum* in its typical ascigerous condition; *Acrospermum graminum*, Lib., in its only recently-recognized ascigerous state (kindly identified for me by Mr. Massee); *Cordyceps entomorrhiza*(?), Dicks, growing from a dead *Polyetes lardaria*, Fab. (a dipterous fly, for the identification of which, I have to thank Mr. G. H. Carpenter). The two last-mentioned Fungi are new to Ireland, and of the highest interest. I do not know that this *Cordyceps* has ever been observed growing from a fly. Dr. Cooke in his recent work on these entomophagous fungi, states—"The only perfect *Cordyceps* yet recorded on Diptera in Europe is one *Cordyceps forquignonii* which has occurred in

France on a dung-fly, *Musca rufa* or *Dasyphora pratorum*." ("Vegetable Wasps," etc., p. 224).—E. J. MCWEENEY, Dublin.

LIVERWORTS.

Irish Liverworts.—To the *Journal of Botany* for April, Rev. C. H. Waddell, B.D., contributes a short paper on the distribution of *Lejeuneæ* in Ireland, remarking that in his opinion the extensive felling of timber and draining of land which have been carried out in recent times has had a marked effect on the moisture-loving species, and quoting some instances of the recent disappearance of such plants owing to these causes. He adds some new stations for North of Ireland *Lejeuneæ*.

ZOOLOGY.

ARACHNIDS.

Argyroneta aquatica in Captivity.—It is with much pleasure that I have read Mr. Johnson's most interesting article on this subject (p. 99). I myself kept a water spider for some time; but it did not live sufficiently long for me to make many notes on the subject. My aquarium consisted of a tumbler with a little fine gravel on the bottom, and a flat pebble supported on two others, under which the spider constructed a web after the manner described by Mr. Johnson. During its short period of captivity it killed a water-boatman (*Notonecta glauca*) which it pulled into its web. After the *Argyroneta* had died I removed the stone under which the web was constructed, and discovered that some small pebbles were attached to the edge of the web, and I at first thought that they had been suspended there by the spider to weigh down the edge; but I afterwards concluded that it had been originally attached to the bottom, and these pebbles had been buoyed up when it was filled with air.—H. LYSTER JAMESON, Killenchoole, Co. Louth.

INSECTS.

A New List of Irish Lepidoptera.—In the *Entomologist* for February, Mr. W. F. de V. Kane commences a new list of the Butterflies and Moths of Ireland, which will be of the greatest use to naturalists, and meets a long felt want. We hope to record the progress of Mr. Kane's work, and to give a summary of his results in each group as it appears.

Lepidoptera of Londonderry.—Mr. Kane has pointed out an error in my list, the species *Geometra vernaria* must be deleted. Mr. Milne informs me that he reared a specimen of *Sesia tipuliformis* last June.—D. C. CAMPBELL, Londonderry.

Lepidoptera at Ardara, Co. Donegal.—Though I paid most attention to the coleoptera at Ardara, I did not altogether neglect other orders, and managed to pick up a few butterflies and moths. Of the latter I should have probably taken more species had not the cold that I caught prevented night work.

The butterflies were represented by the three "Whites," viz.: *Pieris brassicae*, *P. rapae*, and *P. napi*; *Vanessa urticae*; *Satyrus semele*, fairly common on the sandhills, but only just coming out when I left; *Canonympha typhon*, a single specimen on the mountain; *C. pamphilus*, common on the mountain; *Polyommatus phleas*, and *Lycena icarus*. I almost forgot to mention the ubiquitous *Epinephile janira* which abounded in the meadows. Among the moths the following occurred; *Smerinthus populi*, a single male on the shore of the estuary; *Nudaria mundana*; *Cymatophora duplaris*, a single specimen at the Rectory; *Xylophasia monoglypha*, a couple of nice dark forms; *Charaxes graminis*, on Ragweed; *Caradrina quadripunctata*; *Apamea didyma*; the paucity of Noctuae is to be laid to the

blame of the cold mentioned above. *Cidaria truncata*, *C. immanata*, both varying a good deal; *C. testata*, common on the mountain; *Larentia didymata*; *L. casata*, among heather; *Hypsipetes sordidata*; *Emmelesia albulata*, very abundant; *E. adæquata* and *E. alchemillata*, single specimens of each by beating hedges; *Melanippe montanata*; *M. fluctuata*; *Camptogramma bilineata*; *Anaiis plagiata*; *Eubolia limitata*; *Metrocampa margaritaria*; *Hemithea strigata*; *Acidalia dimidiata*; *Eudorea atomalis*, among heather; *Stenopteryx noctuella*; *Pionea forficalis*; *Aphomia sociella*; *Crambus tritellus*; *C. perlellus*, some small varieties; *C. pratellus*; *C. culmellus*; *Tortrix viburnana*, a pale form; *Dichelia grotiana*; *Catoptria cana*; *Pamplusia mercuriana*, I got this beautiful little moth on the top of one of the highest mountains, but it was difficult to catch owing to the wind and the broken nature of the ground; *Grapholitha trimaculana*; *Lita marmorea*, very plentiful on the sandhills at the roots of *Ammophila*.

I am indebted to Mr. C. G. Barrett for kind aid in determining several species with which I was unacquainted.—W. F. JOHNSON, Armagh.

A Beetle new to Ireland,—*Hæmonia appendiculata*, Panz. In Co. Dublin.—While exercising the water-net in the Royal Canal, near Dublin, on the 8th April, I was fortunate enough to take a specimen of this beetle which is apparently of great rarity, I cannot find any records of its recent occurrence in Great Britain, and there are very few British records of any kind, all are from the south of England. The species is chiefly south European in its distribution.—J. N. HALBERT, Dublin.

MOLLUSCA.

Some Notes on the Irish Slugs.—It is to be hoped that by the publication of Dr. Scharff's monograph on the Irish Slugs, and his more recent series of articles in *The Irish Naturalist* for 1892, an impetus will be given to Irish conchology, and that a deeper and more careful study will be the result. With the exception of Dr. Scharff's admirable and exceedingly useful work, comparatively little or nothing has been done amongst the Irish slugs, and this is the more surprising when one considers the many interesting problems connected with the country geographically. Some of my friends, of a very sanguine nature, see in the systematic study of Irish Conchology a host of new and rare forms. Westerlund has recorded several species of *Sphæriidae* peculiar to Ireland.

Regarding the slugs, I think future careful and systematic studies of their distribution will reveal a number of forms not as yet known to occur in any of the British Isles. I am indebted to the kindness of Dr. Scharff for many interesting consignments of Irish slugs, amongst which the following have been found: (1) forms very nearly allied to *Arion cellicus*, Poll. (which species I now regard as a variety of *A. hortensis*, Fér.); (2) a very interesting *Arion*, much smaller than *A. empiricorum*, Fér., of a silvery-grey colour; possibly this may be only a colour-variation of a young individual. It might easily be mistaken for the British form of *A. fuscatus*, Nils. (*A. bourguignati*, Mab., and *A. circumscriptus*, Johnst.). I had only a single specimen, but from what I could make out by dissection it was closely allied to *A. empiricorum*. The reproductive organs were but slightly developed. In Dr. Scharff's work (p. 539) he makes mention of some *Arions* from the west coast, in which the retractor muscles of the oviduct and receptacular duct have their point of attachment on the upper portion of the oviduct and close to the receptaculum seminis. I have suggested to Dr. Scharff that this form may possibly be the *A. lusitanicus*, Mabille, in which species the muscles are so situated. This species has been found in England, and I can see no reason why it should not occur also in Ireland. It is quite possible that many of the slugs which, from external appearances, we at present regard as varieties of *A. hortensis*, Fér., may by careful anatomical investigations prove to be referable to some of the more northerly distributed continental forms. I hope, at no distant date, to publish in the pages of this

Journal, an account of the Irish Slugs I have examined, together with a list of the species and varieties, and shall much esteem any assistance from Irish malacologists.—W. E. COLLINGE, Mason College, Birmingham.

Mollusca from Woodenbridge, Co. Wicklow.—I spent a few days after Easter in the depths of the Co. Wicklow, at Woodenbridge, which I can strongly recommend as a promising collecting-ground. The weather was as fine as could be desired for collecting both land and fresh-water mollusca. Towards the end of my visit I was joined by Dr. M'Weeney, whose great power in detecting microscopic organisms enabled him to find many of the smaller *Helices*. Of the two rarities, *Helix lamellata* and *H. fusca*, we obtained a good number. I was most anxious to get some fine specimens of the fresh-water pearl-mussel (*Unio margaritifera*), which, although absent in some of the Wicklow rivers, is abundant in a few favourable spots in the Aughrim river. It has been stated that one pearl is found on an average in a hundred shells, and that only one in every twenty is of any value as an ornament. But this is a general average which is possibly much exceeded in the shells found in many of the Irish rivers, as I discovered several small pearls in about a dozen specimens. I am not aware that any organised pearl fisheries have ever been established in Ireland, but in Scotland the river pearl industry was of some importance in the 17th century, and British pearls were even spoken of by Tacitus and Pliny.

The following were the species we took at Woodenbridge:—*Vitrea pellucida*, *Hyalina cellaria*, *H. alliaria*, *H. nitidula*, *H. pura*, *H. radiatula*, *H. crystallina*, *H. fulva*, *Arion ater*, *A. subfuscus*, *A. hortensis*, *A. circumscriptus*, *A. intermedius*, *Limax maximus*, *L. marginatus*, *Agriolimax agrestis*, *A. laevis*, *Amalia sowerbyi*, *Helix pygmaea*, *H. rotundata*, *H. lamellata*, *H. hispida*, *H. fusca*, *H. nemoralis*, *Cochlicopa lubrica*, *Pupa cylindracea*, *Vertigo edentula*, *V. substriata*, *Clausilia bidentata*, *Succinea putris*, *Carychium minimum*, *Limnaea peregra*, *L. truncatula*, *Ancylus fluviatilis*, *Unio margaritifera*.

The following species were obtained on the sand-hills at Arklow, Co. Wicklow:—*Vitrea pellucida*, *Hyalina radiatula*, *Arion ater*, *A. subfuscus*, *Agriolimax agrestis*, *Helix rotundata*, *H. pulchella*, *H. hispida*, *H. intersecta*, *H. ericetorum*, *H. acuta*, *H. aspersa*, *Cochlicopa lubrica*, *Pupa cylindracea*, *P. muscorum*, *Vertigo pygmaea*.—R. F. SCHARFF, Dublin.

Planorbis riparius—A Correction.—I recently received genuine specimens of this species from Germany, and on comparing these with the Irish forms alluded to in *The Irish Naturalist* (vol. i., p. 192), I regret to inform the readers of this Journal that the latter do not belong to *Pl. riparius*. They are large specimens of *Pl. crista*, var. *nautilus*.—R. F. SCHARFF, Dublin.

AMPHIBIANS.

Arrested Development of the Frog's Tadpole.—Referring to Dr. Scharff's very interesting paper on Frogs in the January number, I should like to mention that I have in my possession some Tadpoles which have remained as such all through last summer and winter, and as I never before knew of the Frog remaining so long in its primitive form, I should be glad to hear if any of your readers have ever observed this peculiarity, and if so, under what conditions. In the case of mine, there is no hindrance to their getting out of the water when ready, as they are in a rough rock-built basin, with the water always nearly to the lip, but the water is not stagnant—a trickle of Vartry water always running into it, keeping it more or less fresh, but not so much as to prevent duckweed growing freely. Could it be possible that the freshness of the water might have such an effect upon their breathing apparatus as to retain them in their fishy state, and retard their otherwise natural development; or may it be the case that a number do remain over unobserved every year in the ditches without change? for what I have are only a small remnant of the number hatched out from the spawn. They lie in the mud at the bottom, but are quite lively when stirred up. Most of them have the two hind legs developed.—H. M. BARTON, Dublin.

BIRDS.

Crossbills (*Loxia curvirostra*) breeding in Co. Armagh.—

Mr. George D. Beresford, of Castle Dillon, Armagh, informs me that he has on the 28th March seen a pair of mature Crossbills captured near Castle Dillon, by a boy, who on the 6th March found their nest containing four young ones, covered with down of a dark-grey colour (characteristic of the unfledged nestling Crossbill). He put them into a cage, on which he placed some twigs with bird-lime, and thus caught the two old birds, which feed on fir cones and hemp-seed, but the young ones died three days after they were taken. I may remark that Crossbills which were plentiful here at Cappagh from 1889 to 1892, have now become very scarce.—R. J. USSHER, Cappagh, Co. Waterford.

[We hope naturalists will discourage the useless slaughter and capture of these most interesting birds, which would breed freely with us if undisturbed.—EDS.]

Early Arrivals.—The Chiff-Chaff (*Phylloscopus collybita*) was noted at Comragh in this county on the 19th March. I heard one on the 20th, and at Michelstown, Co. Cork, one was noted on the 21st.

A Swallow (*H. rustica*) was seen at Comragh on the 19th March, and up to the 30th it has been still observed there daily flying about the yard, etc., though only the one bird has as yet appeared.—R. J. USSHER, Cappagh.

In *Land and Water* for April 1st, the Chiff-Chaff is recorded as having been heard in the Downs, Wicklow, on March 23rd, and in Tyrone on the 24th.

Abundance of Wild Swans in Mayo, 1892-3.—I subjoin an extract on this subject from a letter I have received from Dr. Burkitt, late of Waterford, now in his eighty-sixth year, residing at Belmullet. He was the correspondent of Yarrell and Thompson, and collected birds at Waterford since 1830, where among the number of specimens that he preserved were the Waterford Great Auk, given by him to Trinity College Museum, the Gold-vented Thrush, and the South African Eagle-Owl, all obtained by him in the flesh from the locality. Of late years he has added to the Irish list the Barred Warbler, which he obtained at Belmullet, in September, 1884. This with a County Waterford specimen of Baillon's Crake he has given to the Science and Art Museum.—R. J. USSHER.

"I had intended mentioning to you as an astonishing fact the unprecedented migration of swans during the winter 1892 to this district. This last winter has been mild, little or no frost or snow, but murky, foggy, wet or stormy, a damp miserable season, elsewhere reported as about the most intensely cold and severe winter on record. From about the middle of November swans appeared, from time to time, to visit this district (the Mullet), until the second week in February, in enormous numbers, *some thousands* reported. Generally swans visit the Mullet in winter, in detached bodies of five, six, eight, or so, amounting to the total number of fifty to a hundred during the winter, but this season on the lake of Cross, about three miles from this, upwards of a thousand were seen together almost daily, for weeks in December and January, and some used occasionally to fly from it to a smaller lake about two miles from this, Turmon Carra, and if disturbed there go back again to Cross. This Turmon Carra, although a very small piece of water, was always a favourite resting-place for ducks, geese, and swans in hard weather, when they migrate to this district.

"The vast majority of these swans were *C. bewicki*. This bird has the receptacle in the sternum for the windpipe as the Whooper has, but not nearly so large nor deep. Mr. Moran shot one on February 6th, a young bird, some greyish feathers being on the head. It was in fine condition being very fat.—ROBERT J. BURKITT."

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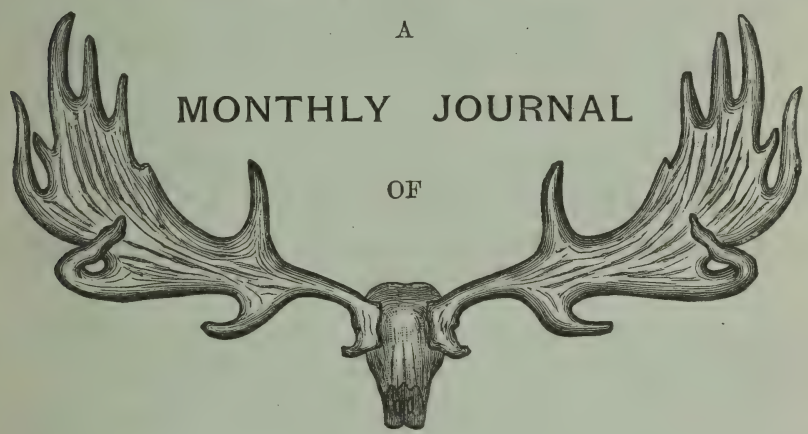
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THE YELLOW-BILLED SHEATHBILL (*Chionis alba*, Lath.)
(Shot at Carlingford Lighthouse, 2nd December, 1892.) [See p. 151.]
[From a Photograph by Mr. Greenwood Pim.]

The Irish Naturalist.

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JUNE, 1893.

No. 6.

THE YELLOW-BILLED SHEATHBILL (*CHIONIS ALBA*, LATHAM) ON THE IRISH COAST.

BY H. LYSTER JAMESON.

OF the many rare birds that have within the last few years been added to the Irish list through the energetic researches of Mr. R. M. Barrington and his correspondents at the Irish lighthouses, none has caused more interest among ornithologists than the Yellow-billed Sheathbill (*Chionis alba*).

The specimen, of which a plate is given in this number, was shot by Mr. Richard Hamilton, lighthouse-keeper, Carlingford, Co. Down, on December 2nd, 1892. Mr. Hamilton describes the capture in his letter to Mr. Barrington (December 9th) as follows:—

“At 8.30 a.m. on the 2nd, I was at the Blockhouse (a small island about 800 yards from the lighthouse) shooting ducks, and saw the bird walking about on the highest part of it, which is not more than ten feet. I at first took it for a tame pigeon, as it seemed to take no notice of me, but observed that it walked differently, at an angle of about 45°, and was not picking at anything; so fired at it about thirty yards, and was surprised to see it go off. It took a half circle of the rock, and again alighted a few yards from the water. I again fired at about forty yards, still the bird stood steady as if not touched—and I consider myself a fair shot,—so I sent the dog to fetch it, and when about two yards from it, it again took to flight, as it seemed quite strong, but fell about fifty yards from the rock. I picked it up with the boat, and from its attitude on the water, I dare say it was a land bird. The wings were partly opened, particularly in front. The shot used was No. 2.”

Mr. Benjamin R. Jeffers, assistant-keeper, who watched the proceedings from the lighthouse with a telescope, described the bird as being quite at ease on the water until the boat came up, when it assumed the attitude described by Mr. Hamilton.¹ He also said that it had a very “proud, bold

For this information I am indebted to Mr. Barrington.

walk," and that the flight resembled that of a Puffin, the motion of the wings a little less rapid. The opening of the wings on the approach of the boat was only natural, for the bird was evidently wounded, as its feathers bear traces of the shot, and it was incapable of rising from the water, one tarsus being broken.

Different systematists have placed the genus *Chionis* in widely different families and orders. Gray ("Genera of Birds"), places the family *Chionididæ* in the order Gallinæ; Cuvier ("Règne Animal"), between the genera *Fulica* and *Glareola*; while Audouin & Co., in their "Dictionnaire d'Histoire Naturelle," rank it among the web-footed birds. The researches of Professor Blainville have, however, now set the matter at rest, as he has shown its structural and anatomical affinities to the Oyster-catchers (*Hæmatopus*); and Mivart ("Birds: the Elements of Ornithology"), places *Chionis* among the *Charadriidæ*, not even assigning to it a sub-family in common with *Thinocorus* and *Attagis*.

Of the genus *Chionis* there are two species,—*Chionis alba* and *C. minor*; the average dimensions are as follows:—

<i>Chionis minor.</i>		<i>Chionis alba.</i>	
Black-billed Sheathbill:		Yellow-billed Sheathbill:	
Total length,	13 inches.		17 inches.
Bill from point,	1.2 "		1.4 "
Height at base,	.7 "		.8 "
Breadth at gape,	.65 "		.75 "
Wing,	9 "		10.5 "
Tarsus,	1.10 "		1.11 "
Middle toe,	1.8 "		2.1 "
Bill black, sheath turned up in front like pommel of saddle.		Bill yellow, sheath flat like cere. ¹	

The bill is very strong and convex; on the cheek there is a bare spot, covered in the adults with yellowish papillæ; wing armed with a blunt knob at carpal joint; second primary longest; tail strong, nearly square; legs reddish-brown (colour seems to vary considerably according to age; and judging from the two specimens I have examined, becomes dull lead-colour after death); hind toe elevated from ground; claws black, short, channelled on under side; irides (? species) dull lead-colour; plumage all over pure white.

¹ For these dimensions, furnished by Professor Newton, I have again to thank Mr. Barrington.

The specimen taken at Carlingford was, doubtless, moulting, as the wing and tail feathers were uneven, but according to my friend, Mr. E. Williams, the old feathers, some of which were not yet cast, showed no signs of captivity. The young differ from the adults in having the papillæ on the face absent, or rudimentary. Not having had an opportunity of consulting a series of specimens, I am unable to say whether the Carlingford specimen had arrived at full maturity. Many voyagers have remarked on the extraordinary odour of the flesh and entrails of this bird, but the smell does not seem to be an essential attribute, as others have not noticed it; Mr. Williams did not think it different from that of other aquatic birds, whereas Mr. Tank declares that a specimen taken on board a ship during a storm, when seventy miles off the coast of Patagonia, and brought to him in a half-skinned condition, had a most remarkable stench, which he compared to that of a seal, and which was retained by the skin some time after mounting.

Both Mr. Williams and Mr. Tank affirm that there was a quantity of fat under the skin, a peculiarity shared by most birds inhabiting cold regions.

Voyagers differ as to the quality of the flesh; some comparing it with that of a duck, but others considering the odour sufficient to condemn it. Mr. Williams remarked that it was coarse and rank like that of an Oyster-catcher. The egg has been described by Prof. Newton in the *Proc. Zool. Soc. London*. I regret that I have not had an opportunity of consulting his paper.

Chionis alba lives like our Oyster-catcher, singly, or in small flocks, on the shores of antarctic islands; it feeds on mollusca, carrion, seaweed, and eggs. The mollusca in the stomach of one opened by Darwin, at Falkland, consisted chiefly of *Patellæ*. Can the odour exhaled by some specimens be due to their carrion-feeding propensities, like that of our Hooded Crow?

Chionis alba inhabits the coast of Patagonia, the Falkland Islands, and South Georgia; while eastward *C. minor* takes its place, inhabiting Kerguelen, the Crozettes, and Prince Edward Island. Darwin and other voyagers remark the great distances from land at which the bird is to be met with in the open ocean, and, according to Prof. Newton, the most northerly

record is latitude 44° S., 260 miles off the coast of Patagonia, which is very remarkable for a wader; 44° S. lat. is also about the northern limit of drift ice, which the Sheathbill is said to frequent, and from which it takes one of its trivial names (Ice-bird). Is it altogether improbable that a bird which has been found occasionally so far from land, should wander still further from its usual limits? and once having reached the West Indies, it would be no more unlikely to fly over the Atlantic than any other of our American visitors, and the natural tendency would be to seek a climate similar to its own for breeding purposes. If the Sheathbill had escaped from any European aviary, the fact would probably have been published before now, and Mr. W. Cross, Liverpool, the well-known importer of wild animals, has not had one alive for several years.

Moreover, it is not a bird a sailor would bring home by choice, as it would require more liberty than the finches and parrots which are usually to be seen in the fore-castle of a merchant ship, while if left at liberty to run about the decks it would probably soon escape, and if pinioned would be drowned in the first heavy sea, as happens to many Guillemots, Razorbills, and even occasionally Fulmars off our coast. The ships which visit antarctic islands are usually small vessels, such as sealers and whalers, from which a Sheathbill would have ample opportunities of escape. If on the other hand it flew on board a large merchant ship on a passage round Cape Horn, the majority of seamen would do their best to secure it for the pot. I write from experience, having seen the breast of an Albatross served up by the apprentices on a first-class London merchant ship. Of the many birds that came on board our ship during my voyage round the world, no attempt was made to tame any except a few finches captured in European waters.

I will not quote as similar instances the many petrels and terns, whose breeding limits are antarctic and circumtropical, as they are purely oceanic, some of them breeding in the extreme south, as Wilson's Petrel, the Sooty Shearwater, and the "Cape Pigeon," which is supposed to have occurred in Ireland, but which Mr. A. G. More and Mr. E. Williams inform me was too hastily accepted on faith of evidence, which at that time seemed sufficient, but which has since been

discredited. Much interesting information on the antarctic and circumtropical species which visit the British shores, will be found in Mr. Henry Seebohm's "Geographical Distribution of British Birds."

Books containing information on *Chionis alba* :—

- Darwin, "Naturalists' Voyage."
 " " "Zoology, Voyage H.M.S. *Beagle* (Birds)."
 Dumeril, "Voyage de l'Ukraine."
 " " "Voyage de la Bonité."
 Gray, "Genera of Birds."
 Shaw, "Naturalists' Miscellany."
 " " "General Zoology."
 Pagenstecher, "Die Vögel süd Georgiens."

THE FLORA OF COUNTY ARMAGH.

BY R. LLOYD PRAEGER, B.E., M.R.I.A.

(Continued from page 134).

***Verbascum thapsus**, Linn. N. — —
 Near Armagh, but escaped; apparently not a native of the county, R. Ll. P.

Linaria repens, Ait. — — S.
 Sparingly on and beside the Greenore railway near the canal locks below Newry, R. Ll. P. Its only other station in Ulster lies six miles to the south-east, on the opposite (Co. Down) shore of Carlingford Lough.

(**Scrophularia aquatica**, Linn. [N.] — —
 "The water figwort or *Scrophularia aquatica* . . . grows on the banks of the Newry water."—*Coot's Armagh*. The determination may be correct, but I saw this species nowhere in the county.)

Melampyrum pratense, Linn. N. M. —
 Mullinure near Armagh, W. F. J. spec. ! On bogs south of An-nagariff lake, and between Lough Gullion and Lough Neagh; in a wood a mile S.E. of Tanderagee, and by the Cushier river near Clare Castle, R. Ll. P.

M. pratense, Linn., var. **montanum**, Johnst. — — S.
 Summit of a rocky hill a mile south of Fathom mountain, at about 800 feet elevation, R. Ll. P.

Veronica montana, Linn. N. M. —
 Copse within the park at Loughgall Manor! and banks of Lough Neagh, More *N.H.R.* Tynan Abbey, and upper and lower demesnes at Tanderagee, R. Ll. P.

V. agrestis, Linn. N. — —
 Grange, near Armagh, W. F. J. spec. !

***V. buxbaumii**, Ten. N. — —
 A weed in the flower borders at Loughgall Manor, More *N.H.R.* I did not observe it in the county; it is now quite common in district 12.

***Mentha rotundifolia**, Linn. N. M. S.
 Occasionally, but only as an escape, R. Ll. P.

- ‡**M. piperata**, Huds. N. — —
Near Tartaraghan and Killylea, but probably an escape from cultivation (form *M. officinalis*, Hull), R. Ll. P.
- Origanum vulgare**, Linn. N. — —
Loughgall (More), *Flor. Ulst.* and *Cyb. Hib.*! Abundant on a high grassy bank a little north of Loughgall; lanes at Derryhaw, east of Tynan, R. Ll. P.
- Thymus serpyllum**, Linn. — — S.
Apparently very rare in the county, and only once observed, R. Ll. P.
- Scutellaria galericulata**, Linn. N. — —
Lough near Killilea (Templeton), *Flor. Ulst.* Loughgall (More), *Flor. Ulst.*! Derrymacash in Seagoe parish, H. W. L. spec.! Near Armagh, S. A. S. Shores of Annagariff lake, R. Ll. P.
- Lamium amplexicaule**, Linn. N. — S.
Grange, near Armagh, W. F. J. spec.! Loughgall, Navan Fort, railway two miles south of Portadown, and on ruin at western base of Slieve Gullion, R. Ll. P.
- L. intermedium**, Fries. N. — —
Grange, near Armagh, W. F. J. spec.! Maghery, R. Ll. P.
- (**L. hybridum**, Villars. [N.] — —
Loughgall (More), *Flor. Ulst.* Not in Mr. More's *N.H.R.* paper nor in *Cyb. Hib.*, and presumably omitted for a reason. I did not find it in the county, but noticed cut-leaved forms of *L. purpureum*, resembling this species, in the north.)
- L. album**, Linn. N. — S.
Common in the limestone district, whence there are numerous records and notes of it; its only occurrences beyond this limited area are Silverwood near Lurgan, H. W. L. spec.! and roadside south of Crossmaglen, R. Ll. P.
- (**Galeopsis speciosa**, Miller. — [M.] —
Tanderagee (O'Meara), *Cyb. Hib.* Not seen since at Tanderagee or elsewhere in the county; many of the older records for this species are unreliable, large-flowered forms of *G. tetrahit* having been mistaken for it.)
- Stachys betonica**, Benth. N. — —
County Armagh (G. R.), *Flor. Ulst.* On an old fort near Tartaraghan (G. R.), *Cyb. Hib.* In considerable abundance at Crowhill, B. N. F. C., 1871. These notes all refer to one station, which is an old wooded rath near the road at the south side of Crowhill, where it was first found by Mr. Robinson. Seen here also by S. A. S. in 1877, but very sparingly. I visited the place both in July and August, 1892, and searched for it without success, but I can hardly believe it has died out, as the ground has been in no way disturbed or altered for many years.
- S. palustris**, Linn., var. **ambigua**, Smith. N. — —
Roadside at Silverwood near Lurgan, H. W. L. spec.! There are two hybrid forms in the North of Ireland; one, the *S. ambigua* of Smith, a coarse form with sub-cordate ovate-lanceolate leaves, tapering to a long point, and nearer to *S. sylvatica* than to *S. palustris*; the other, a smaller plant with narrower leaves, not cordate below, and with a shorter blunter point, and nearer to *S. palustris* than to *S. sylvatica*. To the former (*S. ambigua*) belong the Armagh plant, and a plant found by S. A. S. near Belfast; the latter is the commoner form, and to it all the records of *S. ambigua* in district 12 refer.
- S. arvensis**, Linn. — M. —
Extremely rare in Armagh: a few plants observed in one spot only, in a field near Clare, S.W. of Tanderagee, R. Ll. P.

- Pinguicula lusitanica**, Linn. — — S.
On Camlough mountain, and west side of Slieve Gullion, R. Ll. P.
- Utricularia vulgaris**, Linn. N. — —
Montiaghs bogs, H. W. L. spec.! Loughadian west of Armagh, Drummanmore Lough near Armagh, by Lough Neagh at Derryadd Bay, and drains on Derrywarragh Island at Maghery, R. Ll. P.
- †**Primula veris**, Linn. N. — —
Park at Lurgan (Hyndman), and Loughgall (More), *Flor. Ulst.*; recently seen in the former station by H. W. L., and in the latter by W. F. J. Armagh Palace demesne and Castle Dillon demesne, W. F. J. spec.! Raughlan Point on Lough Neagh, H. W. L. spec.! Perhaps introduced in all these stations, but may be a native on the limestone.
- Lysimachia nummularia**, Linn. N. M. —
In a limestone quarry at Grange, near Armagh, W. F. J. spec.! Lawn in Tanderagee upper demesne, R. Ll. P.
- Glaux maritima**, Linn.
Abundant by estuary of Newry River, R. Ll. P.
- Samolus valerandi**, Linn. N. — —
Shore of Lough Neagh by entrance of Lagan Canal, H. W. L. spec.!
- Centunculus minimus**, Linn. N. — —
Shore of Lough Neagh south of Bird Island, and in a gravel-pit on west side of Derryadd Bay, R. Ll. P.
- Sta tice bahusiensis**, Fries. — — S.
Estuary of Newry River, common, R. Ll. P.
- Armeria maritima**, Willd. }
Plantago coronopus, Linn. } With the last, R. Ll. P. — — S.
P. maritima, Linn. }
Suaeda maritima, Dum.
- Chenopodium bonus-henricus**, Linn. N. — S.
Benburb-bridge (Hyndman), *Flor. Ulst.* Roadside at east end of Lough Ross near Crossmaglen, R. Ll. P.
- Beta maritima**, Linn. — — S.
By brackish streams in Newry, R. Ll. P.
- Salicornia herbacea**, Linn. — — S.
Estuary of Newry River, R. Ll. P.
- Atriplex deltoidea**, Bab. — — S.
Estuary of Newry River, R. Ll. P.
- A. erecta**, Huds. — — S.
Field near Narrow-water, R. Ll. P.
- A. babingtonii**, Woods. — — S.
Shore near Narrow-water, R. Ll. P.
- Oblone portulacoides**, Linn. — — S.
One plant on shore at County bridge near Narrow-water, R. Ll. P. It is abundant on the opposite (Co. Down) shore of the estuary, which is its only station in district 12, and further southward on muddy shores at Dundalk, in district 5.
- †**Polygonum bistorta**, Linn. N. — —
Waste ground at Ardmore Glebe, H. W. L. spec.!
- P. lapathifolium**, Linn. N. — —
Occasionally on the northern bogs; shore of Killybane Lough, near Crossmaglen, R. Ll. P.

P. minus, Huds.

— M. —

By the canal between Scarva and Tanderagee, S. A. S. Shores of Clay Lake near Keady, and of Lough Neagh at Raughlan Point, R. Ll. P.

P. aviculare, Linn., var.

N. — —

A form resembling *P. littorale*, Link, with long diffuse stems and thicker glaucous leaves, occurs on gravelly shores of Lough Neagh, R. Ll. P.

Mercurialis perennis, Linn.

— M. —

County Armagh (G. R.), *Flor. Ulst.* A single locality near Tartaraghan (G. R.), *Cyb. Hib.*; "Tartaraghan" is here a slip or misprint, Tanderagee being the place intended. Several extensive patches by the Cushier river in Tanderagee lower demesne, and at a number of spots in Tanderagee upper demesne, R. Ll. P.

Callitriche autumnalis, Linn.

N. M. —

In Ballylane lake south of Markethill, and dredged up in Lough Neagh at Derryadd Bay, R. Ll. P.

Parietaria officinalis, Linn.

— — S.

Abundant on walls at Newry, R. Ll. P.

***Humulus lupulus**, Linn.

N. — —

In hedges near the Callan river west of Loughall, R. Ll. P.

***Ulmus suberosa**, Sm.

N. — —

Occasionally, but planted, R. Ll. P.

***U. montana**, With.

N. — —

Planted in Co. Armagh (More), *Cyb. Hib.*

Populus tremula, Linn.

N. M. S.

Loughgall (More), *Flor. Ulst.* In hedges and copses throughout the county, in the N.W. especially—probably an original native, R. Ll. P.

***P. alba**, Linn.

N. — —

Occasionally, but only planted or escaped.

Hydrocharis morsus-ranæ, Linn.

N. — —

Bog drains by roadside half a mile south of Derryadd bay, H. W. L.!

In its only present station in district 12 (Portmore, Co. Antrim) it has never been known to flower. On visiting the Co. Armagh station, I found the plant in abundance where described by Mr. Lett; the time of my visit (September) was too late for flower but Mr. Lett's specimen obtained here has a blossom on it, R. Ll. P.

Orchis pyramidalis, Linn.

N. — —

Armagh (G. R.), *Flor. Ulst.* Near Loughgall, S. A. S. Castle Dillon, Loughgall, and Pavilion grounds at Armagh, W.F.J. spec.! Around the north end of Loughgall lake, and at quarries at the western extremity of the Manor demesne, R. Ll. P. Confined to the limestone district.

Gymnadenia conopsea, R. Br.

N. — —

Between Armagh and Loughgall, B.N.F.C., 1877. Near Loughgall and at Mullinure, Grange, and Drummanmore, all near Armagh, W. F. J. spec.!

Listera cordata, R. Br.

N. — S.

Montiaghs bogs, H. W. L. spec.! On Camlough mountain (1,300 feet), summit of Clermont (1,462), and north side of Slieve Gullion (1,500), R. Ll. P.

Neottia nidus-avis, Rich.

— M. —

One plant in a copse at south end of Gosford Castle demesne, R. Ll. P.

Spiranthes romanzoviana, Cham.

N. — —

On a wet worked-out bog in the northern portion of the county. R. Ll. P. I have already (*Journal of Botany*, 1892, p. 272) published the facts relating to the discovery of this extremely rare plant in Co. Armagh. Previously known in the Old World only in the widely separated stations of Co. Cork in Europe, and Kamtschatka in Asia, a habitat in the north of Ireland has now been added, and it is with perhaps pardonable pride that I am able to enumerate it, and *Carex rhynchophylla* as the results of my exploration, made on behalf of the "Irish Naturalist," of the flora of Co. Armagh. I think it better not to publish the exact locality, lest the plant should suffer, at the hands of over-enthusiastic collectors, the penalty of its rarity.

Epipactis latifolia, All.

N. M. —

Castle Dillon, W. F. J. spec.! Ardmore glebe, H. W. L. spec.! Abundant in Tanderagee upper and lower demesnes, and at Gosford Castle; also seen at Clare, and Tynan Abbey, R. Ll. P. Mr. More's doubtful note (N. H. R.), no doubt refers to *E. latifolia*.

Malaxis paludosa, Sw.

N. — —

Moynaghs bogs (Hyndman), *Flor. Ulst.* There is plenty of likely ground on the northern bogs, where I looked for this little orchid, but without success, R. Ll. P.

† **Iris foetidissima**, Linn.

N. — —

County Armagh (G. R.), *Flor. Ulst.* Near Tartaraghan, S. A. S. Hedgebank in Armagh Palace demesne, R. Ll. P.

Sagittaria sagittifolia, Linn.

N. M.

In the Bann near Portadown, *Mackay Rar.* Moynaghs bog (Hyndman), *Flor. Ulst.* Maghery, W. F. J. spec.! Closet River and Scarva, H. W. L.! Newry Canal, S. A. S.! Abundant in sheltered places along the Lough Neagh shore, and in the Blackwater, Ulster Canal, Bann, and Lagan Canal as far south as Goraghowood, R. Ll. P.

Butomus umbellatus, Linn.

N. M. —

In the Blackwater near Maghery (G. R.), and in the canal near Tanderagee, and upper Bann (Jones), *Cyb. Hib.* Ulster Canal between Moy and Benburb, B. N. F. C., 1880. Maghery, W. F. J. spec.! Moynaghs bogs, H. W. L. spec.! The distribution of this plant is exactly the same as that of the last species. I found it abundantly along the Lough Neagh shores and in the waterways which connect with it; it is absent from the other lakes and streams of the county, R. Ll. P.

Triglochin maritimum, Linn.

— — S.

Estuary of Newry River, common, R. Ll. P.

(**Colchicum autumnate**, Linn.

[N.] — —

"The Colchicum, or Meadow Saffron, grows on the borders of the Blackwater and the Callan, and is highly ornamental . . . the flowers are of a variety of shades, of red, yellow, white, and purple; it grows in low meadows," *Coote's Armagh*. Probably an escape from cultivation; not seen by R. Ll. P.

Juncus maritimus, Smith.

— — S.

Brackish places below Newry, R. Ll. P.

J. glaucus, Sibth.

N. — —

Very abundant throughout the limestone area; quite absent from the rest of the county, R. Ll. P. So sharply is its distribution defined, that one could almost determine the boundaries of the limestone district by observing the presence or absence of this rush.

J. gerardi, Lois.

— — S.

Abundantly by the estuary of the Newry river, R. Ll. P.

THE COLEOPTERIST IN IRELAND.*

BY W. E. SHARP.

(Concluded from page 144.)

DUBLIN COUNTY—NORTH COAST.

There are, of course, the usual ubiquitous *Pterostichus madidus*, *Pt. niger*, and *Pt. melanarius*, and in wet places, *Pt. nigrata* and *Pt. diligens*; *Amara trivialis* is also very common, and among them appears a specimen of a larger *Amara*, which proves to be *A. ovata*. This is a species we have only taken in England among river shingle, and it is curious to meet it here in a grass field. It is not a very common species anywhere. Under another stone lurks a still larger *Amara*, *A. aulica*, or *A. spinipes*, as it used to be called. We also add to our list of *Amaræ*, *A. similata*, under a stone close down by the shingle. The only *Bembidium* we get besides the common *B. littorale* and *B. lampros*, is *B. femoratum*. Then there is that pretty little *Badister bipustulatus*, and a specimen or two of *Notiophilus aquaticus*. Among the *Staphylinidæ* nothing noteworthy occurs, and by this time we have reached and passed the little fishing hamlet of Loughshinney, and can see, not far beyond, the harbour and straggling cottages of Rush.

To avoid these we make a detour among the fields. The springing oats are just now turning to green the flattened brown tillage land, and we soon notice a dead scarecrow rook. The robber bird lies prone now, his gibbet having been over-set, and in his half-dried body we find that handsome beetle, *Creophilus maxillosus*, with his great sickle-like jaws, two or three of the black *Necrophorus humator*, and quite a swarm of *Silpha rugosa*. The aforementioned *Silpha subrotundata*, although common under stones, etc., does not appear to share the generic love of carrion. We expected some *Choleva*, *Hister*, or *Saprinus*, but nothing of the kind appeared.

In the lane which led through these fields were moss-covered stones, and a little globular steel-blue beetle settled on them, basking in the sun, proved to be *Phædon tumidulum*. Beneath the stones was *Barynotus obscurus*, and shaken from the hedge above, an example of *Phytobius comari*. We regretted here that we had no net for beating or sweeping, our substitute for such necessary implement only succeeding

in capturing a great number of *Meligethes æneus*. On a dandelion-flower, however, we notice a speck, a touch as of an emerald, this is that beautiful little beetle, *Dolichosoma nobilis*, recently recorded from the Wicklow coast.

A few common *Telephori* and *Rhynchophora* complete our capture here, and we are soon crossing the town of Rush, towards a sandy tract, which we can descry beyond. A long, bare street, disproportionately wide; rows of low, whitewashed, thatched cottages, gardenless and naked. Against the walls lean nets, and the apparatus of the fishers' craft. The masts and spars of a few boats cut the sky at the end of the street, and beyond, the crisp blue sea, and the gentle cliffs and slopes of Lambay. Such was Rush. Beyond the town the coast bends round, and the point runs out in sandhills of no great size or elevation. We approached this ground with some expectancy, as we were somewhat intimate with other sandhills, which fringe the Cheshire sea-coast; and it would be, we thought, interesting to observe how far the inhabitants of these similar localities differed or agreed.

Unfortunately, just about this time, clouds, which had been gathering all the morning, drew together, and not only obscured the sun, but descended in a copious shower. Now, for collecting among sandhills of all places, bright sunshine, and absence of all wind, are essential elements of success. Hence, in the teeth of this blustering squall of wind and rain, we could not expect many captures, and, no doubt, the record of their coleopterous denizens is consequently very incomplete.

The most abundant beetle there seemed to be *Otiorrhynchus atroapterus*. There were also a few specimens of *O. sulcatus*, both crawling on the bare sand, and we also took one *Liosomus ovatulus*.

The Cheshire sandhills, to which we have referred, swarm on occasions with three species of *Hypera*, *H. nigrirostris*, *H. plantaginis*, and *H. variabilis*; also with *Cneorhinus geminatus*, and *Sitones griseus*. There is also to be taken there, more or less commonly, *Grypoidius equiseti*, *Saprinus quadristriatus*, and *Sæneus*, *Anisotoma dubia*, *Notoxus monoceros*, and very profusely, *Heliopathes gibbus*, and *Microzoum tibiale*; a singularly large number of species of *Aphodii* have been taken there, and the Geodephaga are represented more especially by *Calathus mollis*. All of which insects are almost entirely limited in that district to the sandhill zone. Now, of these species, the only

representatives which we took in these sandhills of Rush were *Hypera variabilis*, the *Cneorhinus*, *Heliopathes*, and *Microzoum*, and of these only two or three individuals. The two *Otiorrhynchi*, *sulcatus*, and *atroapterus*, which seemed to be the most plentiful beetles there, are almost unknown on the Cheshire dunes, while the only geodephagous beetles we took were *Dyschirius thoracicus* and *Harpalus tardus*, which latter we take in Cheshire on heaths, and not on the sandhills at all.

On the whole, the coleopterous fauna evident on these Rush sandhills was disappointingly small. This we attribute principally to the weather which then prevailed, but also, to some extent, to the fact that there appeared to be no herbivorous animals grazing among them, and consequently no *Aphodii*, *Staphylinidæ*, etc., and more especially to the low elevation of these hills compared with those on the Cheshire coast. These high summits are a great protection from the wind, and their enclosed hollows and deep rifts act as traps, and are the means whereby those beetles which inhabit them are retained in their recesses, instead of being blown out to sea or across to the unsuitable cultivated land on the other side. I believe that this is the true explanation of the vast number of individuals of such species as people these localities, and which are seen crawling all over the bare slopes on every sunny spring day.

The only other beetle we took here was a specimen of *Brosicus cephalotes*, hidden, as usual, under a loose piece of driftwood. Just at this point, a narrow arm of sea cuts us off from a vast extent of desolate-looking sands, which appear to stretch almost to opposite Malahide. Turning round to the left, before striking up into the country, a low grassy bank claimed our attention, and here we took that fine *Chrysomela banksii*, and also a specimen of *Xantholinus tricolor*. That was our last capture. A tedious and uninteresting road lay between that point and Swords, whose ruined castle and ivy-clad tower we were anxious to reach that afternoon. The bag amounts to something like thirty-five species, none of them specially valuable, and none new to the Irish list. But we have had a pleasant morning's walk in a district to us quite new, and as we catch the outlines of the great Wicklow mountains, dim against the southern sky, we promise to ourselves some further exploration into their recesses, and console ourselves with the possibility of fine upland species to be discovered there.

NOTES ON IRISH CHARACEÆ.

BY H. AND J. GROVES, F.L.S.

HAVING received a good deal of promising material from Ireland, we have for some years past been anxious to see some of the plants in their native condition. During last summer we paid our first visit to Ireland with this object.

Before proceeding to the head-quarters of *Chara tomentosa*, the species we most wanted to study, on the kind invitation of Mr. Barrington we paid a short visit to Co. Wicklow, and under his guidance explored the pools and ditches of the Murrough of Wicklow, as well as some of the mountain lakes. In the former locality we collected *C. polyacantha*, unrecorded for the county, though we learn since that it had previously been found there by Mr. M'Ardle, and in Lough Luggala and Lough Dan we were fortunate enough to get a very fine form of *Nitella gracilis*, also new to the county, and one of the rarest British species.

We next went to Mullingar, and spent a day on Lough Ennell (Belvidere Lake) but were much hindered in dragging by the roughness of the water. We found a considerable quantity of *Chara tomentosa*, but most of it much incrustated and covered with Algæ, a nice little form of *C. aspera*, and in the deeper parts large patches of *Tolypella glomerata*, the last named being new to the county.

During the rest of our stay in Westmeath we were the guests of Mr. Levinge, of Knock Drin Castle, who was good enough to place his boats at our service, and himself guided us to the most likely spots for aquatics in Lough Deravaragh, Lough Owel, and the Knock Drin Lakes. In Lough Deravaragh the most important finds were *C. tomentosa* in plenty, and a few scraps of *T. glomerata*. In Brittas Lough, an artificial lake on the Knock Drin property, which was almost full of Charas, we found some interesting forms of *C. contraria*, a very long slender form of *C. hispida* var. *rudis*, and immense masses of a very fine form of *C. aspera*. In the Scraw bog near Lough Owel, to which Mr. Levinge took us to see some fine *C. polyacantha* and a number of interesting bog plants, we had the good fortune to find *Nitella tenuissima*, which had not previously been collected in Ireland. It appeared to be somewhat local, as we found it in only three

out of a considerable number of peat-pits which we examined. In Lough Owel we found three forms of *C. tomentosa*—one the largest we have seen—*C. polyacantha*, and several forms of *C. aspera* and *C. contraria*.

We spent a few days in Galway, and in some peat-pits to the east of Lough Corrib, near Ballindooly, we found a very fine form of *N. tenuissima* growing with *C. polyacantha*. We also found the latter species in the western division of the county.

From Galway we went on to Killarney, but here unfortunately the weather was very unfavourable for dragging, and the water in the lakes was exceptionally high. We were not successful in finding the little *Nitella* discovered by Mr. Scully, which we formerly referred to *N. gracilis*. Mr. Scully was however kind enough to send us a quantity of fresh specimens, and an examination of these prove that the plant is not *N. gracilis* but a large form of *N. nordstedtiana*. The first Irish specimens of the plant which we received were collected by Mr. Scully in 1889 in Caragh Lake, and these much more resemble a small form of *N. gracilis* than any form of *N. nordstedtiana* with which we were then acquainted.

Since our return from Ireland Mr. Levinge has sent us a sterile specimen of a curious *Chara* collected by him in Brittas Lake, which seems to be closely related to the Swiss *C. dissoluta*. We hope to see fruiting specimens, which are necessary for a satisfactory determination.

We were much struck by the abundance of *Characeæ* in the Irish lakes. The great quantity and diversity of form of *Chara contraria* in the Westmeath lakes were very noticeable. *C. fragilis*, *C. aspera*, and *C. hispida* were common and generally distributed, while *C. vulgaris* and *N. opaca*, though noticed in several places, were not so general as in England. It is curious that the known localities for *N. tenuissima* in the British Isles—Cambridgeshire, Anglesea, Westmeath, and Galway, are nearly in a line from east to west. We think it probable, however, that it will be found to occur in the other peat districts of Ireland, and we hope that Irish botanists will search for this and for the other species likely to be found. *C. connivens*, *C. fragifera*, *C. baltica*, *C. canescens*, *L. alopecuroides*, and *L. stelliger*, which occurs in the south-west of England, should be looked for in pools near the sea in the southern counties. Lough Neagh should be searched for the *Tolypella* which Braun referred to *T. nidifica*, *forma intermedia*.

SOME NORTH OF IRELAND POLYZOA.

BY WILLIAM SWANSTON, F.G.S., AND J. E. DUERDEN,
A.R.C.SC. (LOND.)

IN the summer of 1876 and 1877, W. Swanston and some friends had a few days' dredging off the entrance of Belfast lough, from Larne on the north to Donaghadee on the south, in depths varying from twenty to seventy-two fathoms. The Polyzoa obtained, which were chiefly on stones and dead shells, were sent, at the close of the dredging operations, to Dr. Thomas Hincks, F.R.S., who kindly named them, and duly returned the specimens, accompanied by a list of the species occurring. As this list, which has never been published, contains some very rare species, and gives additional stations for others which are less rare, it is thought desirable that it should be made public.

For the determinations alone Dr. Hincks is responsible; the notes on Irish distribution are the work of J. E. Duerden. Where the names in Dr. Hincks' original list are different from those now adopted, the former are printed in brackets after the modern appellation. The lists which follow contain forty-six species, four of which have not been previously recorded from the Irish coast.

TWENTY FATHOMS, OFF BLACKHEAD.

Bugula avicularia, Linn.—Not previously recorded from Ireland.

Cellepora (?) tubigera.—Busk.

Flustra securifrons, Pall.—(*F. truncata*, Linn.)—Found also from Dublin and Belfast bays.

Tubulipora flabellaris, Fab.—(*T. phalangea*, Conch.)—Mentioned for the first time from Ireland.

Idmonea serpens, Linn.—(*Tubulipora serpens*, Linn.)—Very common, and generally distributed.

TWENTY-TWO FATHOMS, OFF ENTRANCE TO LARNE HARBOUR.

Microporella ciliata, Pall.—(*Lepralia ciliata*, Pall.)—Very generally distributed.

Chorizopora brongniartii, Aud.—(*Lepralia brongniartii*, Aud.)—Also recorded from Dublin and Birrterbuy bays.

Mucronella ventricosa, Flass.—(*Lepralia ventricosa*, Flass.)—Common. From Dublin and Belfast bays.

Schizoporella vulgaris, Moll.—(*Lepralia vulgaris*, Moll.)—Previously obtained from Birrterbuy bay and Antrim coast.

Membranipora pilosa, var. **dentata**, Pall.

M. dumerilii, Aud.—Common on the Irish coasts, recorded by Hyndman from Antrim.

Membranipora catenularia, Jameson—(*Hippothoa catenularia*, Flem).
—Very common on old shells. Recorded by W. Thompson from off the Gobbins, Co. Antrim.

Scrupocellaria scruposa, Linn.—Very common around the Irish coasts.

THIRTY-TWO FATHOMS, DONAGHADEE.

Membraniporella nitida, Johnst.—Fairly common.

Mucronella variolosa, Johnst.—(*Lepralia variolosa*, Johnst.)—A common form.

M. peachii, Johnst.—(*Lepralia peachii*, Johnst.)—A very common species.

Schizotheca fissa, Busk—(*Lepralia fissa*, Busk.)—Not many recorded localities. Obtained from the coast of Antrim and from Birterbuy bay.

Membranipora flustroides, Hincks.—Recorded from Antrim and Birterbuy bay.

M. pilosa, Pall.—Common around all the coasts.

Flustra foliacea, Linn.—Very generally distributed.

Crisia aculeata, Hass.—(*Crisia eburnea*, with spines, Linn.)—*Crisia eburnea*, with spines, was made a distinct species (*Crisia aculeata*), by Hassall; but Hincks, Busk, and Smith, regard it only as a variety of the former. Harmer in his paper on the British species of *Crisia* in the *Quar. Jour. Micros. Sci.*, March, 1891, regards it as a distinct species from its particular form of ovicell, which never occurs in any other type of the colony.

FORTY-SEVEN FATHOMS.

Phylactella collaris, Norm.—(*Lepralia collaris*, Norm.)—Not previously recorded from Ireland.

Mucronella peachii, Johnst.—(*L. peachii*, Johnst.)—A very common form; var. *labiosa* recorded by W. Thompson from Belfast bay.

Microporella malusii, Aud.—(*L. malusii*, Aud.)—Widely distributed; previously obtained from Roundstone and the Antrim coast.

Schizoporella linearis, Hass. (*L. linearis*, Hass.)—A somewhat common species.

Smittia reticulata, J. Macgill. (*L. reticulata*, Macgill.)—Also recorded from Belfast bay by W. Thompson, and from Birterbuy bay by Norman.

Membranipora flemingii, Busk—A form often met with.

Hippothoa flagellum, Manz.—Found also from Mr. Hyndman's Antrim dredgings, and from Birterbuy bay.

Diatopora obella, Flem.—Generally distributed.

Crisia aculeata, Hass.—(*C. eburnea*, with spines, Linn.).

SIXTY-TWO FATHOMS.

Schizoporella auriculata, Hass.—(*Lepralia auriculata*, Hass.).

Mastigopora hyndmanni, Johnst. (*L. hyndmanni*, Johnst.)—Recorded by Hyndman as abundant from the coast of Antrim; also by Thompson from Belfast bay.

Schizotheca fissa, Busk.—(*L. fissa*, Busk.).

Schizoporella linearis, Hass.—(*L. linearis*, Hass.).

Membranipora imbellis, Hincks—Obtained from the coast of Antrim by Hyndman.

Caberea ellisii, Flem.

Cellaria fistulosa, Ellis and Sol.—(*C. farciminoidea*, Ellis and Sol.)—Generally distributed. Recorded previously from Dublin and Belfast bays by W. Thompson.

Flustra foliacea, Linn.

Hippothoa flagellum, Manz.

Stomatopora granulata, M.-Edw.—(*Alecto granulata*, M.-Edw.)—Also recorded by Hyndman as abundant from the coast of Antrim.

BETWEEN SIXTY-TWO AND SEVENTY-TWO FATHOMS.

Phylactella collaris, Norm.—(*Leprallia collaris*, Norm.).

Schizoporella hyalina, Linn.—(*L. hyalina*, Linn.).

Microporella malusii, Aud.—(*L. malusii*, Aud.).

Mucronella peachii, Johnst.—(*L. peachii*, Johnst.).

M. coccinea, Busk.—(*L. coccinea*, Busk.)—Previously recorded by W. Thompson from Belfast bay; and the variety *mamillata* from the coast of Antrim by Hyndman.

Lepralia crystallina?—Norm.

Membranipora pilosa, var. **dentata**, Pall.

M. Flemingii, Busk.

Hippothoa flagellum, Manz.

Membranipora catenularia, Jameson.—(*Hippothoa catenularia*, Jameson).

Palmicellaria skenei, Ellis and Sol.—(*Eschara skenei*, Ell. and Sol.)—Recorded from deep water on the east coast of Ireland by Miss Ball.

Cellepora dichotoma, Hincks—A rather common form, previously recorded from Ireland.

C. ramulosa, Linn.—Belfast bay, by Hyndman.

C. avicularis, Hincks—Also from the coast of Antrim, by Hyndman.

Cellaria sinuosa, Hass.—Recorded from Belfast and Dublin bays.

C. fistulosa, Linn.—(*C. farciminoidea*, Ellis and Sol.).

Caberea ellisii, Flem.—This is a northern form, and the present is mentioned by Hincks as the most southern locality recorded on our coasts.

Flustra foliacea, Linn.

Gemellaria loricata, Linn.—Fine specimens occur around the Irish coasts.

Stomatopora diastoporides, Norm.—(*Alecto diastoporides*, Norm.)—A rare form, not mentioned previously from Ireland.

Diastopora patina, Lam.—Recorded from Strangford lough by W. Thompson.

Alecto sp.

Pustulopora sp.

Crisia eburnea, Linn.—Occurs plentifully on our coasts.

SEVENTY-TWO FATHOMS.

Phylactella collaris, Norm.—(*Lepralia collaris*, Norm.)

Mastigopora hyndmanni, Johnst.—(*Lepralia hyndmanni*, Johnst.)

Caberea ellisii, Flem.

Cellaria fistulosa, Linn.—(*C. farciminoidea*, Ell. and Sol.)

Membranipora imbellis, Hincks.

Stomatopora granulata, M.-Edw.—(*Alecto granulata*, M.-Edw.)

With the exceptions of that for Co. Dublin, this is, as yet, the only important list of Polyzoa we possess for Ireland. The study of these minute, but interesting forms, has been much neglected in our country compared with England and Scotland. Especially have the north and west coasts suffered. Owing to the efforts of recent surveys, however, much is now being done in this group, and already some new and many rare forms have been obtained. Mr. Duerden, who is now working at the Irish Polyzoa and Hydrozoa, will be very glad to receive specimens from any part of the coast, but especially from the north and west, addressed to the Royal College of Science, Dublin.

THE BEAUTY AND USE OF IRISH BUILDING STONES.

BY PROF. GRENVILLE A. J. COLE, M.R.I.A., F.G.S.

*(Substance of a Lecture delivered in Dublin before the Irish Industrial League,
13th February, 1893.)*

FROM a decorative point of view the beauty of a stone depends on its effect upon the eye. In suitable surroundings, there is a rich beauty in the renowned black marbles of Galway and Kilkenny, or in the streaky grey limestones, passing into marble, common throughout the Carboniferous series. There is an inherent beauty in the variegated "Cork Red," which is now being largely used in London, and which has something firmer and more jaspery in its tone than the veined red marbles of South Devon. And, above all in this quality of obvious beauty, beyond all the ornamental stones yet quarried or detected in the British Isles, we have the serpentinous limestones of Co. Galway, the famous "Connemara Green."

But to the stonecutter and the builder, as well as to the geologist, there is a beauty in a good stone beyond that which appeals openly to the eye, a beauty more subtle, requiring a scientific as well as an artistic appreciation—the beauty of lastingness, of durability. An architect's work is not to be padded up with wool and protected for posterity in the glass-

case of a museum. Despite its delicacies of form and moulding, it must, like the Forth Bridge or the steamers of the Irish Mail, earn its crown and glory by weathering out the worst of seasons. As Longfellow wrote in his *Michael Angelo*,

"Painting and sculpture are but images,
Architecture,
Existing in itself, and not in seeming
A something it is not, surpasses them
As substance shadow."

The old cathedral-builders of England, before the days of railways and long sea-carriage, were rather limited in their choice of materials, and, when once they had hit upon a good stone, they went on confidently using it. They were thus guided in most cases by experience; in others, as at Chester, their lack of geological knowledge led them into serious error. Now-a-days, when in our cities public and private bodies vie with one another in the costliness and handsomeness of their offices, a number of stones are being introduced, and a novelty is likely to be well received if its beauties—in all senses—can be demonstrated to the purchaser's satisfaction.

In books published for the guidance of architects and builders there is usually very scanty reference to the real mineral characters that determine the external beauty or the utility of a stone. Too few "practical" workers in the stone-trade have ever been shown how to determine the nature of the cementing material of a sandstone, with a view to learning something of its durability, or how to distinguish granite from dolerite, or even from rocks that are rich in olivine, and therefore liable to decay. The simple chemistry and the structural details of building-stones should be familiar to all who have an interest in their sale or in their purchase; old-fashioned analyses and inexact rock-names would not then be quoted, as they are too often now, to give a show of scientific respectability to circulars intended for the trade.

The constituent minerals of a rock, the materials that bind them together, and the extent to which they have been affected by decomposition, are best seen in a thin section viewed with a polarising microscope. Such sections are now commonly prepared and utilised by geologists; is it too much to hope that one person at least in every great builder's yard may some day be able to examine critically by such means the materials upon which his business-reputation may depend?

The specific gravity of a sample of a rock is often a test of its freedom from alteration. Mr. Walker of Dundee provided us twelve years ago with an instrument on the principle of the steelyard, by which the specific gravity of a rock can be accurately determined, to the second place of decimals, by two operations occupying together some four or five minutes.¹ This admirable instrument is as yet too little known outside scientific laboratories.

A knowledge of the use of the maps of the Geological Survey of Ireland, reference to the published memoirs of that body, and to such papers as Mr. G. H. Kinahan's "Economic Geology of Ireland,"² assist one largely in forming a judgment as to the extent of a stone at the surface, the trend of its outcrop, and its characters and utility as at present ascertained. The basis for most statements regarding the building-stones of this country is still, however, Wilkinson's remarkable work on the "Practical Geology and Ancient Architecture of Ireland," published in 1845.

The power of determining the fundamental nature of a stone, by the means hinted at above, must be applied also in the selection of individual blocks. The continuous export of such materials often depends upon their uniform excellence; and one badly selected mass or slab may bring discredit upon a whole quarry or even upon a county. In this matter every quarry-man has an interest as great as that of the quarry-owner or the builder; whether in blasting, excavating, or shaping, each man employed should possess an intelligent knowledge of the properties of the material beneath his hands.

When, with the absolute truthfulness of scientific method the qualities, the true beauties, of a stone have been ascertained, it should be brought into the market by well trained travellers or exhibitors, who should be able to discuss with an architect the difference between a marble and a granite, or a sandstone and an oolite, a state of things which is far from being realised at the present. Ireland may yet be able to mark a new era in the stone-market by sending out scientific descriptions of her materials, and by placing samples of them in some convenient place of reference in London, with details of their current price

¹ See Walker, *Geological Magazine*, 1883, p. 109; and Cole, "Aids in Practical Geology," p. 24.

² *Proc. Royal Dublin Society*, new series, vol. v., p. 372, etc.

and the customary rates of carriage. The antiquity of the descriptions in the usual works of reference makes it important that quarry-owners and agents should keep the outer world informed at first hand ; for instance, the slates of Ashford, Co. Wicklow, are still quoted in the standard work on building materials published in 1892, while, on the other hand, new materials may easily escape insertion or adequate recognition.

Strange as it may appear, it is necessary to prove the advantages of Irish building-stones even in the country of their extraction. The competition, for instance, with the cheap labour of women and children in Belgium makes it difficult to force Irish marbles upon unsentimental and impecunious persons ; but some of the success of foreign materials is due to technical methods of working, and especially to regularity of supply. Then, again, in a metropolis such as Dublin, a healthy variety of materials must be tolerated. No one can wish to replace the beautiful red brick of Merrion-square, one of the glories of the city on a sunny afternoon, by masses of grey Carboniferous limestone, however elegantly carved ; and even the much-controverted introduction of terra-cotta, a material that will defy the smoke of Liverpool or London, may be best met, not by denying its advantages, but by a search for terra-cotta clays in Ireland.

The virtues of some Irish stones as road-metal call for more adequate recognition. Despite the lamentable absence of steam-rollers, and the usual absence, in consequence, of definite form in the surface of an Irish road, the materials in many counties have proved themselves magnificent, and great credit is generally due to the surveyors and to the workmen for the care with which patches of new metal are inserted during repairs. With the quartzites of Howth and Shankill, as one example, on the very sea-board, one may hope that enterprise and due representation of their qualities may lead to the adoption of Irish macadam in some of the west English cities. The success of Penmaenmawr in Wales gives one grounds for hope, at any rate. Quartzite and limestone in combination, well rolled in, seems an experiment worth trying, especially when we recollect the good dry surfaces produced by a mixture of Kentish Rag and Hythe Sandstone in the neighbourhood of Folkestone some years ago.

(TO BE CONCLUDED.)

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations include a monkey from Dr. A. G. Arthur; a gull from Rev. A. Tabuteau; a Badger from T. Hayden, Esq.; two white rats from Miss Topham; a Ring-tailed Coati from Right Hon. T. A. Dickson, and a pair of doves from W. J. Williams, Esq. A Brown Bear, a Chillingham Wild Heifer, a pair of Cheetahs, and a pair of Peafowl, have been purchased; a Gayal Cow has been acquired by exchange, and five Lion-cubs have been recently born.

17,060 persons visited the Gardens in April.

DUBLIN MICROSCOPICAL CLUB.

MARCH 16th.—The Club met at MR. W. ARCHER'S.

Section of Eurite containing Riebeckite (a blue soda-amphibole), found as pebbles at Killiney, Co. Dublin, was exhibited by PROF. COLE. This rock occurs similarly in the Glacial Drift of Caernarvonshire and the Isle of Man, and its probable source is the eurite with similar structure that forms the mass of Ailsa Craig at the mouth of the Clyde. Riebeckite is known in rocks of Socotra Island, near Aden, of Mynydd Mawr, near Snowdon, and of Ailsa Craig. The abundance of the pebbles at Killiney is of interest in connection with the distribution of the "drift" of the Irish Channel. Prof. Cole stated that he had found a pebble of the same rock in the raised beach of Greenore, Co. Down.

Preparations of a male shoot of Ephedra, showing the flowers in various stages of development, were shown by PROF. T. JOHNSON. The structure of the peculiar pollen-grains, the geographical distribution, and the relation of *Ephedra* to the other *Gnetaceæ*, and of this interesting group to the other Phanerogams, were briefly explained. *Ephedra* had not been previously found in flower by the exhibitor, who had examined, from time to time, for several years past, the specimens of the genus growing in the Royal Botanic Gardens at Kew and at Glasnevin. The particular plant from which the exhibit was taken, grows at Glasnevin, in the Nursery, close to the stone wall, with southern aspect.

Sections of a Human Kidney infected by micro-organisms, were shown by DR. SCOTT. The tubercles were seen blotched with micro-cocci, and large patches of leucocytes were to be found in the neighbourhood of the infected portion.

Section of a Cancerous Tumour prepared by M. Metschnikoff, and kindly forwarded by him, was shown by DR. E. J. McWEENEY. The slide showed in a most typical manner the peculiar rounded bodies which are contained within the protoplasm of the cancer cells, and which are looked upon by an influential school of pathologists as parasitic protozoa, and connected in some way with the tendency to unbounded proliferation displayed by the cells in question.

Fertile specimen of Blepharostoma tricophylla was shown by MR. D. McARDLE. This is a curious and pretty liverwort which is not like any other, except *B. setacea*, Web., which is more common. The leaves are deeply parted into three and often four setaceous-jointed segments, which give the plant the appearance of a species of Algæ. The specimen was collected in Co. Wicklow.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

APRIL 18th.—The President (PROF. FITZGERALD, B.A., C.E.) read a paper entitled "Notes on Electric Power Supply for Tramways, at Paterson, N.J." DR. WILLIAM CALWELL read a paper on "The New Phrenology."

BELFAST NATURALISTS' FIELD CLUB.

APRIL 26th.—Annual Meeting. The President (MR. J. VINYCOMB, M.R.I.A.), in the chair. The report and statement of accounts were submitted and adopted. The report showed a steady increase in all departments of the club's work. The membership, which last year was 323 now stands at 404; the statement of accounts showed an increased balance to the credit of the club. The announcement that in July members would have an opportunity of spending three days in the company of their fellow-members of the Dublin Naturalists' Field Club, was greeted with satisfaction. Mr. William Swanston, F.G.S., was elected President for the ensuing year, and Mr. F. W. Lockwood, Vice-President, and the other officers were, with some slight changes, re-elected. Club prizes were awarded to Miss Clara Patterson, Miss S. M. Thompson, Miss Jeanie Rea, and Mr. W. D. Donnan, for sets of microscopic slides, flowering plants, and beetles respectively.

DUBLIN NATURALISTS' FIELD CLUB.

APRIL 30th.—The first excursion of the season took place. Twenty-four members left town by the Blessington steam tram, and alighted at Balrothery, where the end of a fine Esker, two miles long, was examined under the direction of Rev. M. H. Close. The party then proceeded by tram to Tallaght, and walked to Friarstown Glen, where collecting was carried on, but the botanical specimens were not noteworthy. Among the Coleoptera, Mr. H. R. G. Cuthbert obtained with other common species:—*Benbidium punctulatum*, *B. tibiale*, *B. saxatile*, *B. decorum*, *Amara trivialis*, *Chlaenius vestitus*, *Homalota currax*, *Stenus guttula*, *Hydroporus rufifrons*, *Laccobius alutaceus*, and *Otiorhynchus ligneus*. Among Hymenoptera, *Vespa germanica*, and *Ammophila sabulosa* were noted, the latter being specially early.

CORK NATURALISTS' FIELD CLUB.

APRIL 17th.—DR. W. J. KNIGHT in the chair. The annual report of this club was read by the Secretary and showed a highly creditable condition. Officers for the ensuing year were elected, and some ordinary business transacted.

MISS H. MARTIN and MISS ABBOTT exhibited some fine specimens of plants obtained near Glengariff, Co. Cork. *Mitrella paludosa* Fries, a beautiful little saffron-coloured fungus, floating in bog pools—local; *Hymenophyllum tunbridgense* in fruit—abundant; *H. unilaterale*, Willd. (*H. wilsoni*, Hook.) also in fruit, local; *Ranunculus cœnosus*, Guss. (Floating Crow-foot), local; also *Gentiana verna*, L., received from Galway.

APRIL 26th.—The President, PROF. MARCUS M. HARTOG, F.L.S., in the chair. MR. R. A. PHILLIPS read a paper on "The Land and Fresh-water Shells of County Cork," illustrated by lantern slides, and a fine collection of shells collected in the district.

First explaining the life of snails and slugs in general, their different classes, and the formation and shapes of shells, Mr. Phillips gave a very full and exhaustive description of each species, its characteristics, haunts, and habits, pointing out the species most likely to be found in the county, and the best localities for research. The theories as to the original use of the love-darts of the snail were dwelt on.

Several members exhibited objects of interest.

MAY 10th.—The first excursion of the season to Rochestown took place, when *Cynoglossum officinale*, Tourn. (Hound's Tongue), so rare as an Irish plant, was found by Miss Harriett A. Martin.

NOTES.

BOTANY.

CLUB MOSSES.

Selaginella selaginoides, Gray, in Co. Dublin.—I found this interesting moss-like plant growing on a small shallow bog on the north side of Howth hill, last month. It is not included in Mr. Hart's "Flora of Howth," and I therefore note its occurrence there as interesting. It also grows abundantly amongst the sandhills to the north of Malahide, where Mr. R. W. Scully drew my attention to it a few years ago. This plant was formerly known as *Lycopodium selaginoides*. In Mr. Baker's "Handbook of the Fern Allies," p. 34, the name *Selaginella spinosa*, P.B. Aethog, 112 is given for this plant, and in the 8th edition of the London Catalogue that of *Selaginella selaginoides*, Gray.—DAVID M'ARDLE, Glasnevin.

PHANEROGAMS.

Colour-variation in Wild Flowers.—Mr. Colgan's note on this subject (p. 3) is decidedly interesting, and induces me to contribute the few notes I have on abnormal colours of wild flowers in our north-eastern district. It would appear that white and yellow may be classed together as the more fixed and constant colours, and blue, purple, and red, as the less constant. How invariable are the hues of the white cruciferous and umbelliferous plants, of the Stitchworts and Bedstraws, and of the yellow Buttercups, St. John's-worts, Potentillas, Ragworts, and plants of the Dandelion group; while among blue, purple, and red flowers, more variation is apparent, though some of these, too, are conspicuously constant in shade, such as the scarlet Poppies and blue Forget-me-nots. It may be remarked that the colour-changes affect not only the flowers, for in plants like the Purple Dead-nettle and Marjoram, that have a purplish tinge over the stem and leaves, this hue disappears if the flowers are white, and is replaced by a pure green; at any stage of growth, white Foxgloves or Canterbury Bells may be picked out from purple ones by the colour of the foliage and leaf-stems. The following notes explain themselves:—WHITE FLOWERS:—Burnet Rose (*R. spinosissima*), streaked with red (var. *ciphiana*) on roadside at Castlerock, Co. Derry; Cat's-foot (*Antennaria dioica*), rose-coloured, Mourne mountains, Co. Down, at about 1,500 feet, and on sand-dunes at Castlerock, Co. Derry. YELLOW FLOWERS:—Primrose (*P. vulgaris*), various shades of red not uncommon on the Holywood hills, Co. Down, where also I have found it quite white. BLUE FLOWERS:—Marsh Violet (*V. palustris*), white, marsh on Holywood hills, Co. Down; Devil's Bit (*Scabiosa succisa*), white, on heaths at Dunluce, Co. Antrim, and Castlerock, Co. Derry; pink, on heaths at Cultra, Holywood hills, and Scrabo, Co. Down, and Dunluce, Co. Antrim; Sea Starwort (*Aster tripolium*), white, in saltmarsh at Holywood, Co. Down; Sheep's Scabious (*Jasione montana*), pink, on the Antrim hills; Vernal Squill (*Scilla verna*), white, at Orlock Point, Co. Down, and on Rathlin Island, Co. Antrim; Wild Hyacinth (*Endymion nautans*), white, occasionally in various places. PURPLE FLOWERS:—Purple Vetch (*Vicia sepium*), white, at Marino, Co. Down (R. L. P.), and Lisburn, Co. Antrim (Mr. J. H. Davies, *vide* Mr. S. A. Stewart); Purple Clover (*Trifolium pratense*), occasionally white; Marsh Thistle (*Carduus palustris*), frequently white, from sea-level to 1,000 feet; Heather (*Erica cinerea*), white, near sea-level at Castlerock, Co. Derry, frequent among Mourne mountains at various elevations, and on Knockagh hill, Co. Antrim; pink, with the last; on Slieve Bingian (Mourne mountains), a beautiful rose-coloured form occurred in some quantity; Marjoram (*Origanum vulgare*), white, on walls at

Clandeboyne, Co. Down, and on bank at Loughgall, Co. Armagh; Thyme (*Thymus serpyllum*), white, on sand-dunes at Castlerock, Co. Derry, and Ballycastle, Co. Antrim, and on banks at Bray, Co. Wicklow; Purple Dead-nettle (*Lamium purpureum*), white, in field near Dundonald, Co. Down, and a large patch on roadside at Garron Tower, Co. Antrim; Hemp-nettle (*Galeopsis tetrahit*) as commonly white as purple; Early Purple Orchis (*O. mascula*), white and pale flesh-colour in field at Holywood Waterworks; Fragrant Orchis (*Gynademia conopsea*), white, on heath on Conlig hill, Co. Down; pale pink at Garron Point, Co. Antrim. RED AND PINK FLOWERS:—Ragged Robin (*Lychnis flos-cuculi*), white, in marsh at Holywood; Musk Mallow (*Malva moschata*), frequently white, as on stony shore at Ram's Island, in Lough Neagh, on bank near Newry, etc.; Smooth-leaved Willow-herb (*Epilobium montanum*), white, at Shane's Castle, Co. Antrim; Ling (*Calluna erica*), white, on bogs and mountains in Down and Armagh; Cross-leaved Heath (*Erica tetralix*), white, on Antrim and Mourne mountains, and on bogs in Armagh; Centaury (see p. 168, 1892); Red-rattle (*Pedicularis sylvatica*), white, on heath near Holywood; Spotted Persicaria (*Polygonum persicaria*), white as frequently as red. There are also, of course, some well-known examples, such as Milkwort (blue, purple, white), Downy Rose (red, white), Comfrey (purple, white), English Catchfly (red, white), and Timothy Grass (anthers purple or yellow), which affect two or more colours indifferently, and are as common in one shade as in another. Others, again, affect a gradation of colour, as *Orchis maculata*, which varies from white by degrees to deep purple. From the instances quoted above, it would appear that white flowers vary (very seldom) to red and purple (Mr. More found a deep purple form of the Wood Anemone in Armagh); of yellow flowers, the Primrose is the only example, varying to red and white; blue flowers generally turn to white, occasionally to purple or pink; purple flowers to pink or white; pink and red flowers to white. If other observers will contribute any notes they may have on the subject, we may gain more definite information. I cannot say I have noticed more blanching of colours at high than at low elevations, as mentioned by Mr. Colgan.—R. LLOYD PRAEGER.

ZOOLOGY.

INSECTS.

Lepidoptera of the Londonderry District.—I have been greatly interested in Mr. Campbell's list of Macro-lepidoptera from the Derry district. I was at Kilderry at Easter, and took a *Panolis piniperda* at sallow. This is an addition to his list. The only place I had taken it before was at Howth. I found *Pachynobia rubricosa* abundant, and *Lobophora carpinata* plentiful. I was surprised at the scarcity of *Taniocampa stabilis*, but *T. gothica* and *T. incerta* were as common as usual. *Larentia multistrigaria* was still on the wing, and hibernated *Calocampa vetusta* and *C. exoleta* were at the sallows. I may mention that in March, 1891, I took *Eupithecia abbreviata* in the same locality.—GEORGE V. HART, Dublin.

Lepidoptera at Woodenbridge, Co. Wicklow.—Collecting at Woodenbridge last month was spoilt rather perfectly in two ways—firstly, by the catkins being nearly over; and, secondly, by cold, dry nights. The best insect taken was *Amphydasys strataria*, which I do not know of from Ireland before. I also took a *Taniocampa munda*, which turned up for the first time, I believe, last year at this time in the same place, when Mr. Hart and I secured one each. Two *Lobophora carpinata*, some nice varieties of *Taniocampa gothica*, and one or two other things, make up our catch.—MAURICE FITZGIBBON, Dublin.

[*A. strataria* was recorded from Wicklow by Birchall,—EDS.]

Early Spring Butterflies.—The small Tortoiseshell (*Vanessa urticae*), is usually the first Butterfly observed in spring, as it comes out of its winter-quarters on the first warm days. This year, however, it has been anticipated here by the Small Cabbage White (*Pieris rapae*), a specimen of which appeared in my garden on March 29th. *V. urticae* did not appear till April 7th, when I captured a specimen in very fair order. The Orange Tip (*Euchloë cardamines*), was seen by Mrs. Johnson on April 19th. If the season goes on as it has begun, it should be a splendid insect year, and I hope the "brethren of the net" will keep their weather eyes open for rarities to swell Mr. Kane's Irish list.—W. F. JOHNSON, Armagh.

Two specimens of *Vanessa atalanta* were seen by me at Tullow, Co. Dublin, on April 22nd, and another in Rathmines on the following day. They were all in fine condition, and appeared quite fresh.—WM. STARKEY, Junr., Rathmines, Dublin.

MOLLUSCS.

Pleurophyllidia loveni, Bergh., in Ireland.—Among some specimens trawled in Bantry bay this spring by Mr. A. R. C. Newburgh, and sent up to the Science and Art Museum, Dublin, I lately discovered six specimens of *Pleurophyllidia loveni*, Bergh., the sole British representative of the family *Pleurophyllidiidae* of the order Nudibranchiata (Sea Slugs). Dr. J. G. Jeffreys in "British Conchology," vol. v., gives only two British localities for this species,—viz., Shetland and Whitehaven, Co. Durham. In Leslie and Herdman's "Invertebrate Fauna of the Firth of Forth," a specimen is recorded as having been taken at Dunbar by Prof. F. M. Balfour. Prof. McIntosh records a specimen from off Aberdeen in 1884; Mr. Holt, two specimens from St. Andrews; Mr. Cunningham, one specimen from off the Eddystone; and Mr. Bles, six specimens from Loch Striven, Clyde area, but it has not hitherto been recorded as Irish. *T. loveni* is a north Atlantic form, occurring off the coasts of Denmark, Sweden, and Norway.—A. R. NICHOLS, Dublin.

FISHES.

A Fish New to Ireland, *Motella cimbria*, L.—Mr. A. R. C. Newburgh last month secured the first Irish specimen of the "Four-beard Rockling," in Bantry bay. As its name denotes, this fish has four barbels on the snout, whilst the two common species of rockling have five and three barbels respectively. This species may also be recognized by the dark blotch on the posterior portion of the dorsal fin. It is a northern fish, ranging as far south as Cornwall, where it is extremely rare.—R. F. SCHARFF, Dublin.

AMPHIBIANS.

Arrested Development of the Frog's Tadpole.—Mr. Barton's remarks on some cases of arrested development of the Frog's tadpole are of very great theoretical interest, and I believe he is perfectly correct in attributing them to the fact of the tadpoles living in running water containing plenty of food. I am not aware of any experiments having been conducted with the view to prevent the larva or tadpole from relinquishing its fishy garb, but there are some instances on record that newts have had their transformation forcibly retarded for some seasons by similar methods to those adopted by Mr. Barton. But in these newts, transformation, although delayed, did finally occur. Perhaps the most interesting case known of arrested metamorphosis is that of the Mexican amphibian called Axolotl. In its own country the animal always remains in the fishy state, that is to say, breathing by means of gills, but in confinement it has been successfully transformed into a land animal

by gradually depriving it of the water in which it lived. Theoretically these instances are of great value as illustrating experimentally the origin of species.—R. F. SCHARFF, Dublin.

Frog Remains from Ballynamindra Cave.—In his paper on the "Frog in Ireland," in your April number, Mr. Kane refers to the bones of a Frog found by Prof. A. Leith Adams and myself, in the deposits of this cave as a convincing proof of their antiquity "if the stratum in which they were found was extremely ancient." It was not so, being the surface deposit, termed in the Report "No. 1." At page 207 of the *Transactions of the Royal Dublin Society* for April, 1881, which contains the report on Ballynamindra cave, we read,—“In No. 1 the pellets (?) of rapacious birds, possibly of owls, contained fragments of bones of frogs.” Whether these masses of frog-bones were accumulated by owls or field-mice, there was certainly nothing either in their position or condition to denote their great antiquity.—R. J. USSHER, Cappagh, Co. Waterford.

BIRDS.

Spring Migrants at Armagh.—The Chiffchaff arrived on March 22nd. Sand Martins were seen on the Callan on March 29th, and the first Swallow appeared on April 3rd; the main body of Swallows, however, did not arrive till May. I heard the sweet song of the Willow Wren for the first time on April 6th, and the harsh note of the Corncrake saluted me as I strolled into Mullinure on April 20th. The Cuckoo arrived on April 23rd, but I did not see either House Martins or Swifts till May 5. Why the House Martin should have been so long after the Swallow in its arrival I do not understand, and should be glad to know if the same difference of time of arrival was observed elsewhere.—W. F. JOHNSON, Armagh.

Early arrival of Migrants in Co. Cork.—Chiffchaff, 26th March; Sand Martin, 1st April; Swallow, 9th April; Willow-warbler, 9th April; Cuckoo, 24th April; Swift, 2nd May; Landrail, 7th May; Sedge-warbler, 7th May; Whitethroat, 7th May; Sandpiper, 9th May. These dates are not extraordinary, but when compared with those of last year tend to show that the general wave of migration has been decidedly earlier this year here. Had I greater opportunities of being in the country and of visiting likely haunts, I am sure I should have been able to give a much earlier record, as on most of the dates which I give, I either saw or heard the birds plentifully, and they appeared to have arrived some time.—WM. B. BARRINGTON, Cork.

Hoopoe (*Upupa epops*) in Co. Wexford.—Mr. Wheelocke, the birdstuffer, Wexford, has a Hoopoe in his shop, which, I am informed, was shot at Drinagh, two miles south-east of Wexford, on Good Friday.—G. E. H. BARRETT-HAMILTON, Cambridge.

Black Redstart (*Ruticilla titys*) in Co. Wexford.—A female specimen of the Black Redstart was shot at Ballygeary, near Wexford, on Feb. 22nd, and is now in my collection.—G. E. H. BARRETT-HAMILTON, Cambridge.

Occurrence of the King Duck (*Somateria spectabilis*) in Achill Island.—On December 12th, 1892, I fell in with a male specimen of this fine duck, and as it is of such rare occurrence in Ireland, I thought an account of its capture in the west of Ireland might be of interest. I find Thompson only mentions four specimens having been taken in Ireland. One shot at Kingstown, October, 1837. One shot at Dornane, Co. Kerry, 1843. One shot in Tralee bay, Kerry, 1845-46. One in Belfast in 1850. And according to Mr. A. G. More, our great authority, there is no record of any being taken in Ireland for the last forty-three years. The bird was not in full plumage, but judging from the round white patch on the sides behind the legs, and the mottled white on breast, and the black scapularies and flanks, the bird must

have been in the second year of plumage. It was tame and easy of approach, as I find all these northern stragglers, as was the case when I fell in with the Surf Scoter, and some of the white-winged gulls some time ago. I am now of opinion that if a good look-out were kept along our bold headlands in the autumn and winter, many rare stragglers could be found as they straggle down from the far north and mix up with the migratory birds which frequent our bays in winter, Barnacle, Brent, and many diving ducks. The bird is now in the possession of Edwin Bayles, Esq., of Birmingham, whose collection will be one of the finest in the kingdom. The bird in question was examined by Dr. Bowdler Sharp, of the British Museum, and by Messrs. Seebohm and Saunders.—J. R. SHERIDAN, Dugort, Achill Isle.

Iceland Gull (*Larus leucopterus*) at Londonderry.—On 11th April at 11.45 a.m., I saw an Iceland Gull hovering about the quay here along with some Herring Gulls. The birds were feeding on some garbage thrown from one of the vessels. I noticed the lighter colour of the Iceland and watched it until it circled above and below me, within ten yards. I noted the following particulars on the spot. About the size of large Herring Gull, but body heavier, back and wings very light grey, tips of wings for some inches quite white, bill pale yellow, legs and feet dull red. The bird had lost the second and fourth primaries and one or two of the secondaries of right wing, so that I was able to spot it among the other gulls one or two days afterwards.—D. C. CAMPBELL, Ballynagard, Londonderry

GEOLOGY.

Lough Neagh Petrifications.—In connection with Mr. Swanston's valuable paper on the "Silicified Wood of Lough Neagh," the following very early and very circumstantial version of the popular fable may be read with interest. It is found on one of the descriptive scrolls of Fra Mauro's famous *Mappamondo*, a projection of the sphere executed in 1459 by a monk of Camaldoli, and preserved in the Archæological Museum at Venice. Having made a careful transcript from the original many years ago, I give a rendering here of so much of the passage as clearly relates to Lough Neagh, from which it will be seen that this version of the fable corresponds very closely with that quoted by Mr. Swanston from Boate:—

"In this island of Hibernia, which is passing fertile beyond measure *oltra modo è fertilissima*), 'tis said there is a water, in the which if a man putteth wood, the part thereof that sticketh i' the earth becometh in time iron, and that that is rounded with water becometh stone, and that that is above water remaineth wood . . . and they that desire to be made copious of these and other marvellous matters let them read in Albertus Magnus."

Albertus Magnus flourished about the middle of the thirteenth century, more than fifty years after Giraldus Cambrensis had written his "Topography of Ireland," and one would naturally expect to find that the fable had reached the Continent through Giraldus. But the petrificative virtues of Lough Neagh are not amongst his Irish marvels, though he mentions a spring in the north of Ulster which by its excessive coldness turns wood into stone, after seven years' immersion. Perhaps Mr. Swanton, having so fully explored the archæology of this subject, could point us out the source whence Albertus drew his knowledge of what we may call the ferrifactive properties of Lough Neagh water.—N. COLGAN, Dublin.

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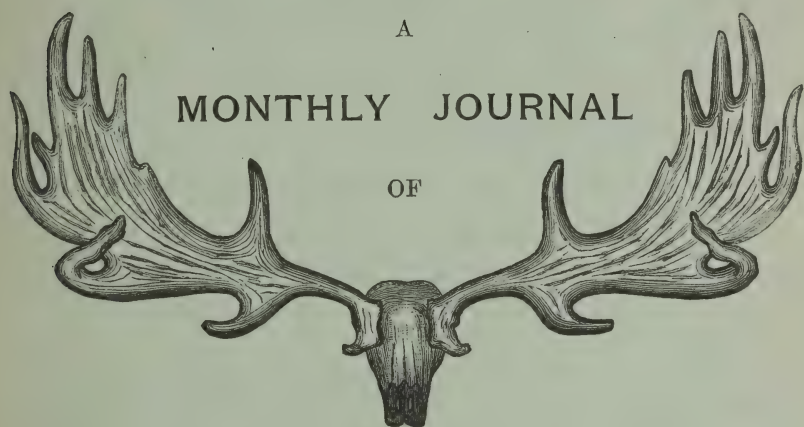
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The Irish Naturalist.

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JULY, 1893.

No. 7.

THE BEAUTY AND USE OF IRISH BUILDING STONES.

BY PROF. GRENVILLE A. J. COLE, M.R.I.A., F.G.S.

*(Substance of a Lecture delivered in Dublin before the Irish Industrial League,
13th February, 1893.)*

(Concluded from page 171.)

FOREIGN competition demands the cheapening of the carriage of some of the central and west Irish stones; perhaps more favourable terms might be made if a constant supply could be guaranteed.

So much, however, for generalities. When we consider particular stones, we see how Ireland, at any rate, has little need to import either her structural or ornamental materials. The homogeneous firm grey limestone, that of Ballinasloe for example, is capable of extensive use in our street architecture. Mr. Drew's handsome Ulster Bank in Dublin, with its rich Roman carving, shows how this stone may be used either massively or for elaborate ornament. Though by tradition we may respect the Portland stone of the Parliament House or Trinity College, there can be no question as to the possibilities of native limestone. As an easily worked structural material, the commoner limestones, both grey and "calpy," have been largely utilised, as in the railway-bridges, or in such massive blocks as Messrs. Boland's Flour Mills, on the Grand Canal. The latter building is an example of the simplest severity; practical stone-cutters will know how much or how little it would have cost to run one or two string-courses round it, with good hand-carving in them, just sufficient to remind Ringsend of the possibilities of commercial architecture, and

that after all, the souls of gas-workers and dock-hands are as worthy of artistic surroundings as the city-clerks of College-green. The chimney of the pumping-station at Grosvenor-road in London is an example of what may be done in this direction; and a love of the plain Irish limestone, arising from a scientific insight into its qualities, may yet end in beautifying many structures in our poorer districts, and in employing artistic labour in quarters where, at the present time, life seems invited to be ugly.

Where the colder grey seems undesirable, Ireland provides a superb pale-yellow building-stone for cities in the sandstones of Fermanagh and southern Donegal. The Mountcharles stone, as used by Sir Thomas Deane in the Museum in Kildare-street, Dublin, will serve as an example of the sharp edges that can be cut out of this hard material. No doubt it may be more costly to work than Portland stone, but any chemist or mineralogist will predict for it remarkable freedom from decay. London, in particular, is seeking for materials that will retain their form and colour despite the penetrating rain and fog. Though the smoke of such an atmosphere clings to almost everything but polished granite and terra-cotta, a fine-grained, pale-coloured, well-cemented sandstone should be able, by its durability, to drive limestones out of the field; and these Carboniferous sandstones of north-west Ireland seem to be more reliable than many English varieties, especially than the red, while they are, at the same time, not too difficult to work.

Granites require careful selection, as the Provost's wall at Trinity College shows; but the National Bank in College-green illustrates how even somewhat delicate caps of columns can be cut in this material. It will be interesting to note whether the light-coloured granites or the Mountcharles sandstones discolour more readily in a city atmosphere. For polished blocks, the grey granites of Newry are well known; and it is possible that, when people have enough of the ubiquitous Peterhead, the red and green granite of Galway, and the red of Donegal, may have a fair chance of public favour.

The brick-and-marble architecture of Italy suggests how two Irish industries might be pleasingly combined; but a white marble gives the most pleasing contrast when laid alternately with the courses of red brick. The real use of

marble in the British Isles, as now in America, lies in internal decoration. There is a most satisfactory taste for marble panelling of walls, even in the palaces of nitrate-kings and the sober haunts of stockbrokers. A splendid exhibit of Irish marbles is formed by the entrance-hall of the new museum in Dublin; while the green "ophicalcite" of Connemara can be seen in perfection throughout the staircases of that building and the National Library. When we consider that the latter stone is practically unique, its nearest ally being the Eozoönal limestone of Canada, it may be hoped that in due time the quarry at Recess may be kept permanently active. The rock seems, like the olivine-bearing masses on Monte Somma, a product of contact-metamorphism; and the hydration of the olivine gives us the beautiful and varied green of the serpentinous streaks and patches. This stone requires to be cut up into slabs, from which suitable ones must be selected to be placed together; but its great charm is its infinite variety—one cannot grow tired of it as one can of Shap granite, or even of the beautiful Italian "Pavonazza." There are more rocks in Donegal also than have ever yet come out of it, and some of its marbles with silicates developed in them may in time prove attractive for ornamentation.

Though the foregoing notes have, in the nature of the subject, been somewhat utilitarian, I have endeavoured to show that the beauty and utility of a building-stone are in reality inseparable ideas. It is the business of practical men to demonstrate the utility of the materials in which they deal; and to do this they must thoroughly appreciate and understand them. This is, I take it, one of the aims of technical education—to teach a man to get the best and noblest out of the materials placed at his disposal. Such education should be within the reach of every man who handles a crowbar in a quarry; but with it comes a stimulus to better and firmer work, such as no considerations of pounds, shillings, and pence can ever give. The toiler among the rocks will learn to feel the beauty of them, and of the long processes by which they have finally come to be; his work will become daily more true, more thoughtful, less mechanical; and he will take care that his use and handling of the stone shall be always for the perfecting of its beauty.

THE FLORA OF COUNTY ARMAGH.

BY R. LLOYD PRAEGER, B.E., M.R.I.A.

(Continued from page 159).

- Typha angustifolia**, Linn. N. — —
 Lough Gullion! and Closet river, H. W. L. Bann-mouth (Davies), S. A. S. Along the southern shore of Lough Gullion, and in some abundance at the mouth of the Lagan canal, R. Ll. P. "Among the ornamental aqueous plants (of Co. Armagh) are . . . the *typha angustifolia*, or narrow-leaved catstail, which produces a fine down, and certainly might be turned to some useful account, as stuffing cushions,"—*Cooté's Armagh*; the cushion-stuffing suggestion rather points to *T. latifolia* as being the plant referred to.
- Sparganium natans**, Linn. N. M. S.
 Bog drains half-a-mile inland from Derryadd bay on Lough Neagh; Ballylane lake south of Markethill; abundant at Clay lake near Keady; Drummuckavall lake near Crossmaglen, R. Ll. P.
- S. minimum**, Fries. N. — —
 Loughnashade near Armagh, W. F. J.! Bog drains two miles south of Portadown, R. Ll. P.
- Lemna gibba**, Linn. N. — S.
 Brackish drains below Newry, and very abundant in the Closet river near its entrance to Lough Neagh, R. Ll. P.
- Potamogeton alpinus**, Balbis (*P. rufescens*, Schrad.) N. — —
 Abundant in stream in Tynan Abbey demesne, R. Ll. P.
- P. alpinus** x **heterophyllus** ? N. — —
 In Lough Neagh at Maghera, R. Ll. P. ("A very interesting specimen,"—A. Bennett).
- P. heterophyllus**, Schreb. N. — S ?
 In Lough Neagh off Ardmore, H. W. L. spec.! Lough Ross near Crossmaglen, ("? A puzzling plant, off *heterophyllus* towards *nitens*,"—A. Bennett) R. Ll. P.
- P. angustifolius**, Presl. (*P. zizii*, Roth.) N. — —
 Lough Neagh off Derryadd bay, H. W. L. spec.! Lough Neagh near Kinnegoe, R. Ll. P.
- P. lucens**, Linn. N. — S.
 In the canal at Goraghwood (S. A. S.), Herb. N. H. P. S. spec.! Lough Neagh off Raughlan, H. W. L. spec.! Lakes at Tynan Abbey and Loughgall Manor, and in Lough Neagh at Kinnegoe, R. Ll. P.
- P. obtusifolius**, Koch. N. M. S.
 Ditches communicating with Lough Neagh near Lurgan (Moore), *Cyb. Hib.* (as *P. gramineus*). Drummuckavall lake, Mullaghmore lake, lake at Carnagh near Keady, and abundant at the mouth of the Closet river, R. Ll. P.
- P. crispus**, Linn. var. N. — —
 Of a curious pond-weed, without fruit, which I obtained in the canal between Caledon and Battleford Bridge, Mr. Bennett writes:—"This is *P. crispus*, L., f., perhaps a modification of var. *serratus*. It might eventually prove a cross with one of the linear-leaved species, but the apex of the leaves, stem, and venation are *crispus*. It is an even more reduced form than that from Stirling."
- P. pectinatus**, Linn. N. — S.
 Lough Neagh at Derryadd bay, H. W. L. spec.! In Lough Neagh at east side of Ardmore Point, and in great abundance at the entrance to the canal at Maghera; brackish pools below Newry, R. Ll. P.

Potamogeton filiformis, Pers. N. — —

In shallow water in Lough Neagh on east side of Ardmore Point, R. Ll. P. This rare pond-weed was long known in Ireland as confined to a limited area in Co. Mayo. More recently Mr. Barrington found it in Lough Erne, and Mr. Hart in Donegal; a station on the eastern side of Ireland is now added.

P. fluitans (auct.), Roth ?

In Lough Neagh at Maghery, R. Ll. P. ("This is *P. fluitans* of English authors and of continental, but whether of Roth is difficult to say, as no one has ever seen a specimen named by him,"—A. Bennett).

Cladium mariscus, R. Br. N. — —

All around Loughgall lake, More *N. H. R.*! Grows now chiefly on the western and southern sides, R. Ll. P.

Rhynchospora alba, Vahl. N. — —

Bog at Annaghmore (G. R.), *Flor. Ulst.*! Maghery and Portadown, S. A. S. Montiaghs bogs, H. W. L.! Of frequent occurrence on the northern bogs, often in abundance, R. Ll. P.

Eleocharis multicaulis, Smith. N. — —

Frequent on the northern bogs, and noted from a number of stations there; Loughadian near Armagh; not seen on the southern mountains, R. Ll. P.

E. acicularis, Linn. N. — —

Banks of Lough Neagh, More *N. H. R.* Ardmore Glebe, H. W. L. spec.! Banks of Closet river, R. Ll. P.

Scirpus maritimus, Linn. — — S.

Estuary of Newry river, abundant, R. Ll. P.

S. sylvaticus, Linn. N. M. —

Damp meadows near Loughgall, More *N. H. R.* Riverside near Newry, H. W. L. spec.! By the Blackwater at Maghery, by Cusher river at Clare, at Tynan Abbey, and in several spots between Armagh and Castle Dillon, R. Ll. P.

S. tabernæmontani, Gmel. — — S.

Brackish drains below Newry, R. Ll. P.

S. pauciflorus, Lightf. N. — —

Occasionally on the northern bogs, but rare, R. Ll. P.

S. fluitans, Linn. N. M. —

Wet bog at Maghery (S. A. S.), Herb. N. H. P. S. spec.! Marsh by Lough Neagh south of Morrow's point, Derrywarragh island at Maghery, bog south of Portadown, and margins of Clay lake near Keady, R. Ll. P.

S. savii, S. and M. — — S.

Salt-marsh by the sea-wall below Newry, R. Ll. P.

Carex dioica, Linn. — — S.

Rare, only observed on Slieve Gullion, R. Ll. P.

C. disticha, Huds. N. — —

By the lake at Loughgall, More *N. H. R.* Loughnashade near Armagh, S. A. S.! Lowry's Lough near Armagh, W. F. J. spec.!

C. vulpina, Linn. N. — S.

Loughnashade near Armagh, and by the canal below Newry, R. Ll. P.

C. paniculata, Linn. N. — —

Near Maghery, B. N. F. C., 1871. Tartaraghan, S. A. S. Loughgall, Loughnashade, and Mullinure, all near Armagh, W. F. J. spec.! Croaghan island in Lough Neagh, H. W. L. spec.! Kinnegoe by Lough Neagh, R. Ll. P.

C. canescens, Linn. N. — —

"Near Tartaraghan, Rev. G. Robinson,!!" More *N. H. R.*; and

subsequently, S. A. S. Bog between Annaghmore and Maghery, B. N. F. C. 1871. Ardmore, H. W. L. spec.! Bog near Annagarriiff lake, R. Ll. P.

Carex stricta, Good.

N. M. —

By the lake at Loughgall abundantly, More *N. H. R.*! Mr. More believes that the variety mentioned in his paper was, as suggested, only a starved state of the plant. Ardmore, H. W. L. spec.! In some quantity by Lough Neagh at east side of Raughlan Point, and abundant on margins of Lough Gilly S. W. of Poyntzpass, R. Ll. P.

C. acuta, Linn.

N. — —

By Lough Neagh at Raughlan, H. W. L. spec.!

C. pallescens, Linn.

N. — —

Mullinure near Armagh, W. F. J. spec.! Ardmore, H. W. L. spec.!

C. strigosa, Huds.

N. — —

Ardmore, H. W. L. spec.!

C. pendula, Huds.

— M. —

By the Cusher river in Tanderagee lower demesne, H. W. L.!

C. œderi, Ehr.

N. — —

Loughgall, and islet in Lough Neagh, More *N. H. R.* The latter station is possibly in Tyrone.

C. hornschurchiana, Hoppe.

— — S.

On Slieve Gullion, R. Ll. P.; apparently rare.

C. xanthocarpa, Delg.

N. — —

This supposed hybrid I obtained on the boggy shores of Derryadd lough in the N.W.; the determination was made by Mr. Bennett.

C. lævigata, Sm.

N. — —

Near Armagh, W. F. J. spec.!

C. pseudo-cyperus, Linn.

N. — —

Tartaraghan (G. R.), Herb. N. H. P. S.! On visiting the spot described by Mr. Robinson in answer to inquiries—the streamlet below the glebe house—I found about half-a-dozen fine plants, with abundant fruit stems three to four feet high; Mr. Robinson has also given me “near Lurgan” as a station; R. Ll. P.

C. rhynchophysa, C. A. Meyer.

— M. —

Sparingly in a deep drain on the margin of Mullaghmore lough near Markethill, R. Ll. P. This fine sedge, which resembles *C. rostrata (ampullacea)* in general habit, is an addition to the British Flora. For full details of its synonymy, bibliography, and European distribution, the reader is referred to *Journal of Botany* for February, 1893. Suffice here to say that it is a native of northern Europe, inhabiting Scandinavia, Russia, etc. I succeeded in obtaining one specimen only, which, after a careful examination by Mr. Arthur Bennett, F.I.S., and comparison with continental examples in his own and the Kew herbarium, is referred unhesitatingly to *C. rhynchophysa*, C. A. Meyer. By the kindness of the editor and publishers of the *Journal of Botany* I am enabled to reproduce the figure of the Armagh plant which appeared in the *Journal* (Plate 5).

Since the above went to press I have visited the locality (June 9th) and obtained several specimens, but the plant appears to be very rare in its only station.

C. paludosa, Good.

N. — —

Lakeside at Loughgall, More *N. H. R.*! Abundant and very luxuriant in the lake of Tynan Abbey demesne, B. N. F. C., 1873!; plentiful by streams and at the margin of the lake, *ibid.*, 1889; a specimen from this station is in Herb. N. H. P. S. In a marsh a mile N. E. of Loughgall, R. Ll. P.

(TO BE CONCLUDED.)

THE BREEDING OF THE GARDEN WARBLER IN THE SHANNON VALLEY.

BY R. J. USSHER.

It is an experience of high interest to the ornithologist when he first makes acquaintance with a species new to him, especially if he finds it in haunts previously unrecorded in his native country.

Thompson's correspondents found the Garden Warbler (*Sylvia hortensis*, Bechst.) in Antrim, at Ballybrado, in the south of Tipperary, and near Cork. The late Sir Victor Brooke observed several pairs frequenting the natural woods at Castle Caldwell on lower Lough Erne, where, as Mr. J. C. Bloomfield informs me, he is well acquainted with these birds, and observed them last spring.

I first heard the song of the Garden Warbler on one of the naturally wooded islands of Lough Erne, on 9th June, 1891. I again heard the song on 7th June, 1892, uttered from a thicket of blackthorn on Nun's Island in the centre of Lough Ree, and caught a glimpse of the bird, but failed to get a shot at it. My further acquaintance with it is due to Mr. Anthony Parker of Castle Lough, whose beautiful demesne, on the Tipperary side of Lough Derg near Killaloe, contains many vestiges of natural wood. He sent me, on the 10th May last, for determination, a fine male Garden Warbler shot there, which is now destined for the Science and Art Museum. He subsequently discovered the nest of another pair, which on the 26th May I had the pleasure of seeing. It was in a secluded corner of his grounds, but not far from the house and approach, and was placed in a mass of loose briars about two or three feet from the ground, a few trees, saplings, and elder bushes standing round. It was composed of dried stems of grasses and other plants, and lined with a few root-fibres and hairs. It contained five eggs in the first stage of incubation. I saw the female quit it, and soon discerned her threading her way through neighbouring bushes, uttering her warning note, which consists of the repetition of a sound not unlike the slow winding of a clock. To obtain full proof of the species, I shot this bird after seeing her leave the nest, and she also is in the hands of Messrs. Williams & Son. Before approaching the nest I heard in its vicinity the song of

the male, which was continued in the same place the day after he had lost his mate. Another male sang habitually in a group of hazels between the flower-garden and the lake, and others in different parts of the demesne, but always about spots where there were masses of briars and a variety of shrubs and deciduous trees, not in a dense compact mass, but open between. Mr. Parker had noted eight or nine places where he had recently heard this species, and since my departure he has heard it elsewhere, but always in his demesne. The same bird might be heard throughout the day, and day after day, repeating his song at intervals about the same spot, where probably the nest was situated, as in the case of that which I took. If one approached, the song would stop, and soon recommence from a neighbouring tree or bush, but the bird secluded itself so carefully among the foliage as to be very rarely and briefly seen.

It was a powerful and sweet song that might be heard distinctly at a considerable distance, and contained some deep notes, recalling those of a Blackbird, but were not dwelt on with the emphasis of a Blackbird's song. This was uttered in a volley, high and deep notes struggling as it were to get out. In a few seconds it stopped, to recommence presently, after the manner of a warbler's. It is far sweeter and deeper than the brief chattering song of the White-throat, which I had opportunities of comparing with it, and it is uttered for a longer period at a time.

On 1st June I revisited Nun's Island, in Lough Ree, Co. Westmeath, and in the same bush where I heard it last year, a Garden Warbler was again singing, while another was rivalling his song on a different part of the island, which is encircled by a belt of tall Blackthorns.

Next day I visited the extensive woods of Castle Forbes, Co. Longford, which stretch for miles along Lough Forbes, an enlargement of the Shannon, and are evidently mainly of natural growth. Here I soon recognized the now familiar song, and as I wandered on came to a spot where a Garden Warbler was singing, close to a path, yet so closely did he seclude himself, that he sang again and again unseen, always changing his whereabouts, while I watched for nearly an hour. I then came to another place where I heard a similar song, and while moving about I was met by the alarm note of the female,

The male presently arrived, with a green-drake fly in his mouth, and both birds being excited about my proximity to their nest, gave me opportunities of seeing them perfectly—the olive brown head and back, the slightly paler mark over the eye, the buff tinge on the throat and breast, and the white underparts. They used to come into a Wild Cherry when I withdrew, and I was convinced their nest was in the briars near, but I failed to find it until I had been absent for a while. On returning, I saw the bird in the cherry bush, and then alighting among the briars at a point where I believed these to be too low to hold the nest: but here it was, composed of grass stems exclusively, and containing four partially fledged young, which on my nearer approach quitted the nest, and it was with much difficulty that I secured one for the Museum by searching among the herbage on the ground. I heard the Garden Warbler's song in four places at Castle Forbes, evidently uttered by different birds, each of which keeps to his own haunt. I subsequently heard a bird of this species singing repeatedly for a long time from a neighbouring bush, while inspecting the picturesque ruins of the Seven Churches on Innishcleraun or Quaker Island, belonging to Co. Longford, in the northern part of Lough Ree, and in a different part of the same island, where great masses of Hawthorns and briars formed towering fences, I heard both the song and the warning note. After this I heard a Garden Warbler singing in a plantation near the house at Derrycarne, in the Co. Leitrim, on another of the lake expansions of the Shannon.

The farthest point I reached was Hollybrook, in Co. Sligo, on Lough Arrow. This beautiful demesne, lying between the mountain and the lake, contains the most picturesque and varied natural jungles, mingled in places with rhododendrons, and introduced species of trees. Here I heard the Garden Warbler's song in two places, in each of which it was as usual repeated, morning and afternoon, day after day, leaving no doubt that the birds were settled and breeding there. Mrs. Ffolliott writes on the 17th June:—"The Garden Warblers have been singing continuously the last few days, up near the house."

During my several observations of them I have seen the birds at different times, and they always agreed with the specimens shot at Castle Lough, and were not Blackcaps,

which I could have easily distinguished had I seen them; but it has been remarked by Mr. Howard Saunders that the two species are not found commonly in the same resorts.

I have thus identified the Garden Warbler in five counties from Tipperary to Sligo, having met with it in large demesnes, or on islands where some remnants of the natural growth have been preserved. I have not found it in woods of Fir and Larch except where these were mixed with the indigenous wood. Its range is known to extend to Fermanagh, and it was formerly observed in Cork, and there is some reason to think it has been met with in Mayo. It should be looked for in all parts of Ireland where suitable haunts occur. Its song, however, uttered in May and June, is the chief means of recognizing it, and this is so little noticed that no one I met with, except Mr. Parker, had appeared to distinguish it or to know the bird. The warblers, from their skulking habits, and the brief period of the year that they sing, are among the least known of our land birds. The Wood Warbler should also be carefully looked for. Mr. R. E. Dillon has shown me a skin and egg of this species taken at Clonbrook in the Co. Galway, where he has heard the bird again this season, though I was not so fortunate.

THE EARTHWORMS OF IRELAND.

BY REV. HILDERIC FRIEND, F.L.S.

(Continued from page 122.)

I HAVE named the remaining group of *Allolobophora*, *Virgata*, because of the bands of colour which characterise the principal types (see page 42). Since that paper was written Dr. Rosa, of Turin, one of the best authorities on earthworms, has published a volume of great value and interest entitled *Revisione dei Lumbricidi*, in which he treats the whole subject from a wider standpoint, thus presenting the matter in a much truer light than it is possible to place it in when dealing only with a limited section. I must, however, adhere to my arrangement, and now deal with the species included under

GROUP IV. *Virgata*.

In the Irish worm-fauna there are at present only two species under this division. One of these is very widely distributed not only in Great

Britain, but also abroad. The other has hitherto been found only in a limited area in Ireland; it does not occur, so far as at present known, in England; but is identical with a species, or sub-species, found on the European Continent.

Allolobophora fœtida, Savigny.—THE BRANDLING. This interesting species has been known to the angler for ages past as a most enticing bait for fish. So far as I have been able to glean, it was first recorded under this name of Brandling by the renowned author of "The Complete Angler." "For the trout, the Dew-worm, which some also call the Lob-worm, and the Brandling, are the chief." Thomas Moufet, whose "Insectorum Theatrum" appeared in 1634, speaks of it as Duggs, but I am unable to find any scientific term among the writings of Linnæus which indicates that he had learned to distinguish it from the common earthworm. Such writers of the present century on angling as Hofland, Stoddart, and Younger, call it the Brandling, or Brambleworm. The name has reference to the brand-marks, or alternate stripes of brown and yellow colour, by which the worm is at once recognised. It was first described as a distinct species in 1828 by Savigny, who named it *Enterion fetidum*, the specific term being in allusion to the peculiar characteristic, and by no means attractive odour, which proceeds from the worm when handled.

The Brandling is from two to six inches in length, and has an average of about 100 segments. The girdle occupies the 26th to the 30th, the male pore being on the 15th. On the under surface of the 28th, 29th and 30th girdle-segments are the band or clitellar papillæ (*tubercula pubertatis*). The worm is not only brindled or striped, but exudes a large quantity of yellow fluid, which stains the fingers, and leaves a most unpleasant odour behind for a long time. It is probable that this, like the ink of the *Sepia*, is intended as a means of protection, and while the worm is greatly relished by certain fish, there can be no doubt but that its habit of throwing off a disagreeable fluid makes it very repugnant to some of its enemies. The 9th, 10th, and 11th segments are conspicuous by reason of their lighter colour and greater diameter, owing in part to the presence of important sexual organs in that region. The lip is tender and pallid, extending backwards into the 1st segment, or prostomium, to about one-half its diameter. The first dorsal pore is between segments 4 and 5.

This worm is peculiarly fond of old manure. It is still a problem how it finds its way to the heaps. If manure be deposited in a given place, where the worm appears to be unknown, a number of specimens will be almost certain to occur within a year, and the next season, when decomposition is complete, the worms may be counted by thousands. They probably have some acute sense of smell, by means of which they detect the whereabouts of a suitable nidus for their eggs and incubation.

DISTRIBUTION IN IRELAND. Ferns, Co. Wicklow (Dr. Greene); Black-rock, Co. Dublin (Miss Kelsall); Cork (Miss A. N. Abbott); Holywood, Co. Down (Miss Clara M. Patterson); Valencia, Co. Kerry (Miss Delap); Malahide, Co. Dublin (Dr. Trumbull); Portsalon, Co. Donegal (Mr. Hart); Glasnevin, Co. Dublin (Mr. Redding); Leeson-park, Dublin (Dr. Scharff), etc.

Through the courtesy of Dr. Scharff, I received in the middle of June, 1892, a consignment of earthworms collected in his garden at Dublin, which included, in addition to several species already well known to occur in Great Britain, one which has been taken in no other part of the United Kingdom. I submitted a detailed account of this interesting animal to the Royal Irish Academy last November, and must refer the reader to the *Proceedings* of that Institution (3rd ser., vol. ii., No. 3, pp. 402-410) for the statements then made. Since that time further

light has been thrown upon the question of this worm's identity from an unexpected quarter. I wrote some months ago to Dr. Rosa, the Italian helminthologist, respecting the species under consideration, and learned in reply that there was undoubtedly a close affinity between it and a species or variety (*A. veneta*) which he had discovered at the same time on the Continent.

Dr. Rosa has, within the past few days, favoured me with a copy of his newest work on the subject of Earthworms, and in this volume (*Revisione dei Lumbricidi*, 1893, p. 34) he does me the honour to print a full account of the Irish worm as a sub-species of *Allolobophora veneta*, Rosa.

Allolobophora hibernica, Friend.—IRISH WORM. When living, and extended in the act of crawling, the worm is about 50 mm. or two inches in length. In spirits it is from one to one and a-half inches, or 25 to 35 mm. long, and thus ranks in size with three or four of our British dendrobænic worms, such as the Tree-worm (*A. arborea*, Eisen), or the Celtic Worm (*A. celtica*, Rosa). Unlike those, however, its colour is fleeting, so that immediately upon being placed in alcohol the small quantity of colouring matter which is present in the living worm evanesces, leaving the preserved animal without the least indication of its pretty appearance in a state of nature. The anterior portion of the worm when alive is of a rosy hue, closely approaching flesh-colour; the girdle is of a dull yellow, while the rest of the body, excepting the caudal extremity, is a greyish hue, appearing brown along the line of the dorsal vessel. The last half-dozen segments are yellow, just as in the Gilt-tail or Cockspur of the angler (*A. subrubicunda*, Eisen). The presence of a pigment, which is exuded from the dorsal pores, accounts for this yellow tinge, which in the most adult specimens may be found pervading other portions of the body to a slight degree.

With a worm so short as this, it is rather unexpected to find so many segments, but the average is 90-100, so that they are very narrow, and closely arranged side by side. In this respect they come very near the Constricted Worm (*A. constricta*, Rosa). The position of the first dorsal pore has yet to be determined. In the Mucous Worm it can be readily seen, not so here.

The male pores are found on each side of the 15th segment, being easily recognised in adult specimens by the small papillæ upon which they are seated. In some worms bearing a close relationship to this species, the papillæ are so large as to affect the two adjoining segments (14-16), but, in this case, no such prominent position is held by them. The girdle is conspicuous, dense, and closely fused on the dorsal surface, but each segment is clearly defined beneath. It covers six to eight segments, two only of which bear the *tubercula pubertatis*. The general outline of the girdle ventrally closely resembles that of the nearly allied Mucous Worm (*A. mucosa*, Eisen), as it is truthfully portrayed by Eisen in the plate which accompanies his original description.

One rather striking peculiarity may here be emphasized. In several species of worms, such as the Brandling (*A. fætida*, Sav.), the Long Worm (*A. longa*, Ude), and the Common Earthworm (*Lumbricus terrestris*, L.), we find a tendency on the part of those segments which contain the sexual organs to become tumid and pale on the ventral side. In this case, however, it is the dorsal surface which is so affected, especially in segments 10 and 11, and on the worm being dissected, the cause of this unusual appearance is at once discovered. Whereas in most species of worms the spermathecae are ventrally or laterally placed, in the Irish Worm they are disposed on the back.

I was fortunate enough to find eight specimens of this worm in the batch consigned to me, and had recognised the novelty of the worm as soon as the first specimen or two had been transferred to alcohol, so that

I was able deliberately to study the whole series, first in a living state, and afterwards in spirits. I have since received two large series of the same worm from Dr. Scharff, by means of which I have been able to confirm and extend my earliest observations. The number of segments ranges between 86 and 108, so that the average is about 100. I find that whenever the number of segments in an adult worm falls below the average, there is a tendency for the segments to increase their longitudinal diameter. This inclines one to the opinion that there is a normal length which it is desirable for each worm to attain, if it is to discharge the functions of life in the fullest and best possible manner.

In the *Atti del R. Inst. Venet.*, iv. (1885-6), p. 674, Rosa gives an account of the earthworms of Venice, and, among others, makes mention of a new species, which he designated the Venice Worm (*A. veneta*, Rosa). As stated above, he is now inclined to regard my *A. hibernica* as a subspecies of this. In 1889, he published a note on a worm found in the Botanical Gardens of Coimbra, in Portugal, as well as in Liguria, the characters of which showed it also to be a variety of the foregoing. From what we learn respecting it we may judge that it approaches *A. hibernica* more nearly than the latter resembles *A. veneta*.

DISTRIBUTION IN IRELAND. Though the only locality from which I have received the typical worm is Leeson-park, Dublin, I have three specimens which closely resemble it from Miss Smith, Piperstown, Co. Louth. These specimens suggest the advisability of searching for others. Consignments may be addressed:—"The Grove," Idle, Bradford.

(TO BE CONTINUED).

A PLEA FOR THE ROTIFERA.

BY MISS L. S. GLASCOTT.

WHAT is a Rotifer? There are few people who have not some idea at least of what this name implies, for, small as it is, it has doubtless found its way into many of the journals, magazines, etc., of the day, whose editors recognise the growing love for natural history, by devoting a few pages to that delightful study; but as "the interests of the minority"—that burning question—may not be neglected with impunity, we will endeavour to describe "the nature o' the baste." There are those who would cut the Gordian knot with alacrity by stating that it is "a water insect," the name insect being often applied promiscuously to all animals under a certain size—very convenient, no doubt, if a trifle ambiguous. Our little friend has indeed been rather badly treated; it has been shouldered about from pillar to post with scant ceremony, by some great people who ought to know better, but I believe, as in the case of the square man in the round hole, there were difficulties about accommodation. At present we find it quartered among that large and for the most part disagreeable group of animals,

the "worms." Having thus placed our rotifer among its relations, we will next proceed to describe its appearance.

A denizen of the water, of microscopic size, it is barely to be seen by the naked eye, as a tiny white speck moving about against a dark background. The microscope reveals its typical form as that of a short cylinder, of which the upper end—the head—is furnished with a wreath of hairs, or *cilia*, which is kept in constant motion, having just the appearance of a revolving wheel (hence the name), and which serves a double purpose, that of an aid to locomotion, and that of creating a vortex to entrap the necessary pabulum. Besides this wreath of hairs, the head is also furnished, in the greater number of species, with lateral ear-like and ciliated appendages which can be everted or withdrawn at the will of the animal. The lower end terminates in a foot of one or several joints, which at its extremity is either developed into a suctorial disc, or bears one or more toes of a chitinous texture. The integument of the body is either soft and flexible, or hardened into a glassy coat, termed the "lorica," which is often developed into beautiful and fantastic patterns.

Tiny atom as it is, the creature possesses a comparatively high organization. A large brain occupies the interior of the head, and in connection with it are one or more eyes, sometimes of a most brilliant red or rose-colour, their position and number varying according to the species. It has jaws and teeth of quite formidable proportions, and knows how to use them too; in some families these are formed for biting and cutting only, in others they are modified into pounding and crushing machines. The digestive system is simple and easily discerned; it consists of a stomach, intestine, and gastric glands, which latter are usually in the form of two clear globate bodies seated on the fore-part of the stomach, at either side of the œsophagus. The excretory system is represented by loose, irregular, and sometimes branching tubes, which originate in the head, descend to and terminate in a clear bladder-like vesicle situated near the end of the body, which dilates and contracts at regular intervals, and is termed the contractile vesicle. There is a well-developed ovary, which lies along the ventral floor, and usually one or two ova are to be seen in an advanced stage of development. The muscles in some species are very conspicuous, notably in *Pleterodina*, in which they are

seen stretching out in ribbon-like bundles from the viscera toward the margins of the glassy plates of the lorica. The variety of forms to be found among the Rotifera bids defiance to any description in a paper of such prescribed limits as this ; suffice it to say that in each we find a beauty peculiar to itself. The prevailing colour is white, the tissues of many species being of such transparency that every detail of the internal structure is discerned with the greatest ease, and when to all this, enclosed in a little speck, measuring from $\frac{1}{30}$ to $\frac{1}{500}$ of an inch, is added the charm of an intelligent activity, of busy purpose, of graceful movements, of variety of character and temperament, of evidence of passions in common with our own, such as those of fear, of pleasure, of various desires, surely it is superfluous to say that in the study of the Rotifera we will find a keen and instructive pleasure.

But little is known of their habits and life-history, for though they have received some attention from naturalists of various nationalities, these have directed their observations more to the peculiarities of form, and to the internal structure, than to this department. Here then is a tempting field for our energies, surely it is time for us to be up and doing. Neither need we imagine it the only one remaining to us ; numerous and varied as are the forms recorded belonging to the group which have been so ably described and portrayed in that splendid book "*The Rotifera*," the joint work of Dr. Hudson and the late Mr. P. H. Gosse, without which no library is now complete, the list is far from being exhausted ; in the course of my own limited researches I have met with numbers of new and interesting members of almost every family among them, some of which I have endeavoured to sketch.

They are to be found in all waters, salt and fresh, but more especially in the latter. Pools, ponds, rivers, streams, tanks, water-butts, all afford good hunting-grounds. Many of them may be caught swimming in clear water, but the greater number delight to frequent small aquatic plants, algæ, moss, dead submerged leaves, sedimentous deposits, etc. Most of them are vegetarians in diet, but there is also a carnivorous class who fare sumptuously on dead animal substances, and are to be found within the skins of aquatic larvæ, the shells of tiny Entomostraca, dead flies which have met an untimely fate, and allied objects. There are parasites among them too,

both internal and external, which feed upon their unwilling hosts; I have discovered lately two very formidable creatures which infest the eggs of water-snails and destroy whole clusters of them; and last but not least, there are cannibals, but this savage taste is restricted to some of the most innocent and guileless-looking of them all, the Floscules (a warning not to trust to appearances), and their name reminds me that I had almost forgotten to make mention of the group to which they belong, called the "Rhizota" (the rooted), which take first place, if not first rank, in the eyes of the authorities. As their name denotes, they remain fixed to one spot, within gelatinous tubes which are often strengthened with extraneous materials. Very beautiful indeed are their flower-like forms and "revolving wheels," but e'er the would-be admirer of their charms approach, let him take care first to arm himself with the patience of Job, for verily he will have need of it. Their coyness and timidity would well-nigh tempt that patriarch himself to make use of a few epithets more forcible than polite; after long watching perhaps, as the creature slowly and cautiously uprears itself beyond the sheltering walls of its dwelling-house, when every nerve is tightened with expectancy, as the extremities are upon the point of being unfurled—an inadvertant touch—a step upon the floor—a tremor in the table from some unlooked-for source, and behold! it has vanished, and the weary watch must begin again; but courage! I have noticed in them a marked appreciation of temperature, and on some auspicious occasions they seem to forget their fears, and exhibit a boldness and freedom of action which quite takes one by surprise. A drop of hot water applied to the edge of the cover-glass is often productive of very good results, and well worth the trial. But time presses, so having paid them this brief tribute of notice, I must bid them adieu, and trust that these few words may awaken an interest and invoke a desire for personal acquaintance with these fascinating little creatures in the minds of those to whom they are yet strangers.

In conclusion I would warn the Rotifer-hunter against choosing a day after heavy rains for his researches; the one quality of water a rotifer eschews is that fresh from the clouds, and testifies his disapproval by disappearing from his usual haunts.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a Muscovy Duck from Miss Stubbs; three Belgian hares from H. Thynne, Esq.; four Golden Orioles from the Galway stall at the "Kosmos" bazaar; a White Pheasant from Mr. Hunt; a pair of Peafowl from the Governors of the Hospital for Incurables, Donnybrook; a Blue-breasted Lory from Miss McCausland; a pair of American Blue Robins from Mrs. O'Connor; three Ring-Doves from F. C. K. Cooper, Esq.; a Ring-necked Parrakeet from T. J. Lane, Esq.; and a pair of Kestrels from Constable B. Collins. A Yak has been born in the Gardens; an Ostrich, seventeen Prairie Marmots, and three monkeys have been acquired by purchase.

12,000 persons visited the Gardens in May.

DUBLIN MICROSCOPICAL CLUB.

APRIL, 20th.—The Club met at DR. SCHARFF's, who showed the shell of *Helix lamellata*—a terrestrial mollusc. Apart from its rarity, it is interesting chiefly from the fact that it is almost confined to the British islands, which seems to suggest the probability of its having originated there. The epidermis of the shell is thrown at regular intervals into most delicate folds, giving it the lamellar structure from which the species derives its name.

DR. MCWEENEY showed a simple form of moist chamber which he had found very efficient. It consists of a coffin-shaped glass vessel about half an inch deep, and covered with a glass lid which fits accurately. The micro-mount—in water or *nährlösung*—is simply placed in this vessel, a few drops of water having previously been introduced. The lid is put on, and the preparation remains unaltered for weeks, as evaporation is prevented by the saturation of the air contained in the vessel. It may be removed at any time for examination under the microscope, and the glass lid enables one to see with the naked eye whether any obvious development (or multiplication) of the enclosed objects has taken place. The whole apparatus can also be readily sterilised, but it is hardly adapted for repeated examination with the oil-immersion, owing to the difficulty of cleansing the upper surface of the cover-glass.

The same exhibitor showed a stick of *Acrospermum graminum*, Lib., a curious spheriaceous fungus, with a singly erect flesh-coloured perithecium, one-twentieth of an inch high. The cylindrical asci each contain eight filiform spores, which are of such tenuity, that it takes an extremely high power and good definition to distinguish them individually as they lie within the asci. The ascigerous condition of this fungus is stated by Mr. G. Massee, of the Royal Herbarium, Kew (to whom specimens had been forwarded by the exhibitor), to have been only recently recognized, and the species itself has not hitherto been met with in Ireland. He also showed the *Cordyceps* found on *Poliotes lardaria*, already noted in the *I. Nat.* (p. 146).

PROF. G. A. J. COLE showed a section of silicified oolitic limestone of Middle Devonian age, from near Ilfracombe, exhibited on behalf of Mr. F. Chapman, F.R.M.S., and described by him in the *Geological Magazine*, 1893, p. 102. In this rock the first signs of shearing have been set up under earth pressure, and the oolitic grains show interesting elongations, deformations, and even truncations where they have been pressed against one another. A number of sinuous fissures have developed in the mass.

PROF. T. JOHNSON showed *Wildmania miniata*, f. *amplissima*, Foslíe. At a recent meeting of the club he had shown herbarium specimens of this one-layered *Porphyra*-like red alga, but was not able to say whether

the species was a native of Ireland or simply a drift weed. The material in the bottle now exhibited showed that the plant is not a drift weed. The slide preparation showed the thickenings of the stalk by the down-growth of filaments from the lower cells of the thallus, a mode of thickening found in several sea-weeds.

MR. DUERDEN exhibited a new species of *Bourgainvillia* from Bantry Bay, obtained growing on the appendages of a *Stenorhynchus*. The form has not yet been fully described. It is regarded as intermediate between *B. muscus* and *B. ramosa*. The gonophores, which are well developed, grow in clusters. A peculiar feature is the presence of long fusiform bodies, which have been regarded as nests of parasitic larvæ, but are shown to be actual parts of the colony itself. In the gastric cavity of some of the polypites a small parasitic nematode was found.

MR. M'ARDLE exhibited a specimen of *Jubula hutchinsiae* (Hook), var. *β. integrifolia*, showing perianths and the amentæ, which bear the male flowers (*androcæcia*). This is the form described by Dr. Gottsche in "Synopsis Hepaticarum," p. 426, as having been found in Java by Blume. The specimen was collected by Mr. M'Ardle in the Maghanabo Glen, near Castlegregory, Co. Kerry, growing on the fronds of *Dumortiera hirsuta* (Swartz.), var. *irrigua* (Tayl. sp.), which is found in New Granada. Professor Lindberg, who also collected this rare plant in Co. Kerry, states in his paper on Hepaticæ collected in Ireland, that the plant is found in North America and in the island of Java.

MAY 18th.—The Club met at MR. GREENWOOD PIM'S, who showed leaves of the almond, of a brilliant crimson colour. The micro-section showed that the chlorophyll had almost entirely disappeared, and was replaced, especially in the vicinity of the fibro-vascular bundles, with red-coloured cell-contents, but no trace of fungoid-growth of any kind was discernible. Later on, however, these leaves lost somewhat of their bright colour, became bullate and thin; the characteristic asci and spores of *Ascomyces deformans* were then found in abundance.

MR. HEDLEY exhibited the head of *Cysticercus tenuicollis*, which is the bladder worm of *Tænia marginata* of the Dog. He remarked that although there was reason to believe this form of bladder worm was plentiful, yet he had failed to find any record of its occurring in Ireland. The specimen showed the crown with thirty-two hooklets, and four suckers, or bothria, and occurred, with several others, in the omentum, or caul of a lamb. The life-history of these interesting Cestoidæ is pretty much like those which infest the human subject. The cystic stage is found in sheep, in the liver and serous membranes of the abdominal cavity. These are eaten by the canine species, and after the bladder is digested, the young worm attaches itself to portions of the alimentary tract until mature. The eggs are voided in feculent matter, and carried into pools or other moist surfaces, where they undergo change, being protected by three membranes, between which an oily material exists. They eventually arrive in the abomasum, or fourth stomach of the sheep, and the membranes are digested, thus liberating the embryos, which at once penetrate the walls of the stomach, or if lower, in the tract of the intestines, finding their way to the liver, or serous abdominal membranes already referred to.

MR. G. H. CARPENTER showed the leg of a female pycnogon, *Phoxichilus levis*, Grube. The muscles, nerves, intestinal diverticulum, and ovary, were well seen in the preparation.

MR. H. H. DIXON showed preparations of the leaf *Hakea victoria*, showing the peculiar structure of the stomata, and the inner tissues of the leaf.

MR. J. JOLY showed crystals of calcespar containing fluid-cavities, and exhibiting remarkable polarising effects.

BELFAST NATURALISTS' FIELD CLUB.

MAY 20th.—First excursion of the season to Antrim and Muckamore. A party of forty proceeded to Antrim by 10.15 train, where the shores of Lough Neagh, at the mouth of the Six-mile-water were first inspected.

It was still rather early for botanising, but *Draba verna*, *Ranunculus fluitans*, and *Cerastium arvense*, were noted. Road was then taken for Muckamore, a halt being made at Boghead to inspect a fine souterrain recently discovered there. On the route thither, *Carex strigosa*, *C. paniculata*, *Geum intermedium*, and *Ophioglossum vulgatum* were noted. After tea at Antrim, a business meeting was held, when a motion was passed congratulating the senior secretary (Mr. Praeger) on his appointment to the National Library of Ireland, Dublin, and expressing regret at his consequent resignation of the secretaryship of the Club. The party returned to Belfast by the 5.53 train.

DUBLIN NATURALISTS' FIELD CLUB.

MAY 27th.—The excursion to Skerries, attended by forty members, was not very productive botanically, but Mr. Cuthbert collected the following Hymenoptera on the low walls and sandbanks to the north of the village:—*Terebrantia*, *Tenthrenopsis scutellaris*; *Chrysis ignita* in great abundance, and various Ichneumons; Aculeata, *Odynerus pictus*, and *Pemphredon lethifer*. Thirty-six species of Coleoptera were taken by Mr. F. A. O'Brien. Two of these, *Otiorrhynchus maurus*, and *Rhynchites anevirens*, are new to the Dublin list; whilst a third, *Tachinus intricatus*, has been once before recorded from Chapelizod.

CORK NATURALISTS' FIELD CLUB.

MAY 17th.—Excursion to Myshall, where a most interesting day was spent.

MAY 27th.—Excursion to Pota, where Mr. Osborne very kindly conducted the members through the grounds, and showed them the choice collection of trees and shrubs. About thirty-five availed of this excursion.

MAY 31st.—MR. J. H. BENNETT in the chair. MR. DILLON read a paper on "The Earthworms of Co. Cork" compiled from notes kindly lent by the Rev. Hilderic Friend, F.L.S. The structure of worms was first dealt with and the distinguishing characteristics of the two classes into which they are divided. The results of experiments made with light were given as showing the apparent absence of the organs of sight and hearing, and Mr. Dillon then gave some interesting facts as to the mode of life and habits, and a description of the different species to be found in the county and their haunts.

JUNE 14th.—Excursion to Glenbower Woods, where a most enjoyable evening was spent. Some specimens of *Hymenophyllum tunbridgense* were found, and a good number of entomological specimens.

ROYAL IRISH ACADEMY.

APRIL, 10th.—Mr. F. W. Moore read a paper for MR. MCARDLE on "The Hepaticæ of the Hill of Howth." The list is important, and shows that the locality is rich in this class of plants; thirty-seven species are enumerated, many of which are very rare and interesting. Two are new to Ireland—*Cephalozia francisci*, Hook, and *Anthelia juratzkana*, Limpr. A third species, *Cephalozia denudata*, Nees, which grows abundantly on Howth hill, had previously only been known to grow in the Co. Mayo. Mr. McArdle claims the following fourteen species as being also new to the Co. Dublin, additions to the last list of that county published by the late Dr. D. Moore (*Sci. Proc. R. D. S.*, 1878):—*Cephalozia fluitans*, Nees; *C. divaricata*, Smith; *C. elachista*, Jack, (rare); *C. curvifolia*, Dicks; *C. multiflora*, Spruce; *C. catenulata*, Huben; *Blepharostoma setacea*, Web.; *Jungermania minuta*, Crantz (rare); *J. incisa*, Schrad.; *Pellia calycina*, Nees; *Metzgeria conjugata*, Ray, (Lindb.). The list is provisional only, and is the first attempt at a detailed account of these plants that has been made by any person for this locality so far as we are aware. From the number of species it will be

obvious that Howth is by no means below the average of any other similar locality on the Irish coast.

MAY 8th.—PROF. W. J. SOLLAS read a paper on "The relative age of the Igneous Rocks at Barnavane, Carlingford." The intrusion of the granite into the gabbro at Barnavane was noted by Dr. Haughton and by Mr. Traill. There is no doubt whatever as to the accuracy of their conclusions; but we find in places the two rocks most intimately mingled, a fine plexus of granite veins, even on a microscopic scale, penetrating the gabbro, which becomes reduced to isolated flecks and fragments. Certain specimens, treated apart from the field evidence, would have been considered as gabbro containing mere segregation-veins. The independence of the two magmas is, in the surface-phenomena, at any rate, completely demonstrable, despite the actual fusion of portions of the gabbro by the invading granite. A good discussion followed, in which Dr. Haughton, Dr. V. Ball, Mr. G. H. Kinahan, Prof. Cole, and Mr. J. Nolan, took part.

MR. J. E. DUERDEN read a paper "On some new and rare Irish Polyzoa." The contribution dealt with the known British species of *Receptaculum*, *Crisia*, *Triticella*, and *Ascopodaria*. Examples of the finest British species of *Receptaculum*, *R. conchii*, Hincks, were exhibited. Prof. Allman's discovery of *Receptaculum beaniana*, King, from the west coast was confirmed. The six British species of *Crisia* were recorded from Dublin bay, including the newly-described *C. ramosa* of Harmer. The occurrence of three species of *Triticella* was described. Two, *T. horeonii*, G. O. Sars, and *T. pedicellata*, Alder, have been only once recorded from English waters, and *T. boeckii*, G. O. Sars, is recorded for the first time from British waters. The abundance in which these rare forms occur on the west coast of Ireland has enabled the author to show the presence of a horny crest in all the three known species of this genus. The recently described species *Ascopodaria nodosa*, Lomas, was found by Mr. Duerden in material from Killiney bay.

ROYAL DUBLIN SOCIETY.

JUNE 21st.—PROF. G. A. J. COLE in the chair. MR. R. J. MOSS read a paper "On a Graphitic Schist from Donegal." An analysis showed that graphite was not present in sufficient quantity for the rock to be commercially valuable.

MR. G. H. CARPENTER read a paper "On some Pycnogonida from the Irish Coasts." The cruises of the "Fingal" and "Harlequin" and other collections, examined by the author, have yielded the following species:—*Nymphon gracile*, Leach, Dublin, Queenstown; *N. rubrum*, Hodge, Dublin; *N. gallicum*, Hoek, west coast; *Phoxichilidium femoratum*, Rathke, east and west coasts; *Anoplodactylus petiolatus*, Kr., west coast; *Phoxichilus spinosus*, Mont., west coast; *P. laevis*, Grube, Dublin and west coast; *Pycnogonum littorale*, Strom, east and west coasts. Only the first, fourth, and last of these are recorded in Thompson's list in the "Natural History of Ireland"; the other six species in that list must probably remain of doubtful identity, except *Chatonymphon spinosum*, Goods. The form now called *Phoxichilus laevis*, Grube, has been recorded in the *Irish Nat.* (vol. i., pp. 42, 168) as *P. spinosus*. The two forms are distinguishable, but it may be doubted if they can be regarded as distinct species.

MR. GILBERT C. BOURNE contributed a paper on "The Post-embryonic Development of Fungæ." The budding and separation undergone by these corals is suggestive of an alternation of generations.

SELBORNE SOCIETY, FERNS BRANCH.

We are glad to learn that a branch of the Selborne Society has been formed at Ferns, Co. Wexford, under the presidency of Dr. G. E. J. Greene; Miss M. Kenny is the Honorary Secretary and Treasurer. The new society intends to devote itself especially to the study of Natural History; we heartily wish it success, and hope to record the results of its work.

NOTES.

BOTANY.

Earliness of the Season.—I found the Dingle mountains covered with *Pinguicula grandiflora*, on Whit Monday, May 22nd. I also found wild Strawberries ripe on the same day.—ERNEST H. BENNIS, Limerick.

On June 9th, *Meconopsis cambrica* was in splendid bloom on the Comeragh mountains. I also found *Hymenophyllum tunbridgense* in fruit. *Sedum rhodiola* was not in bloom.—J. ERNEST GRUBB, Carrick-on-Suir.

The Royal Forest of Glencree.—At a meeting of the Royal Society of Antiquaries, recently held in Kilkenny, Mr. Mills read a paper on this subject which had been prepared by Mr. T. P. Lefanue, B.A. From it we learn that as early as the 11th century Irish Oak was known, as would be seen by the request of William Rufus for Irish Oak for Westminster Hall.

As soon as the English had obtained a firm footing in the country a Royal forest was started, and the portion of the country more especially set apart was the valley of Glencree.

In 1244 eighty deer were sent over from the Royal Park at Chester, and the existence of some kind of enclosure was evident. That the deer were watched was plain from the fact that in 1291 a neighbouring abbot was attacked and accused of taking game with "nets and engines," and with "taking beasts and working his will with them to the injury of our Lord the King." From the foregoing springs the question: what kind of deer were introduced? the Fallow Deer seems not to have been introduced into England at the above date, so we must conclude that Red Deer were sent; that they were very numerous in this country at a very early date, is proved by the frequent "finds" of their bones in large quantities.—J. G. ROBERTSON, Dublin.

ZOOLOGY.

INSECTS.

Irish Wasps—*Vespa arborea*, Sm. at Bray.—Mr. R. M. Barrington kindly sent me during May and June a number of queen wasps taken near Bray. The vast majority proved to be *Vespa vulgaris*; there were also twelve specimens of *V. rufa*, seven of *V. norvegica*, one of *V. sylvestris*, and three of that very scarce form *V. arborea*, which has hitherto been recorded only from Yorkshire, Gloucestershire, Scotland, and Switzerland. My identification has been kindly confirmed by Mr. E. Saunders, who, however, informs me, that he considers it possible that this wasp may be merely an aberration from one of the other species; its male and worker are at present unknown.

Edgeworth in his paper on "Irish Vespidae" (*Proc. N. H. S. Dub.* vol. iii. 1864), records *V. germanica*, so that we now know all the British species of the family in Ireland, except the Hornet (*V. crabro*), which in all probability will not be found here.—G. H. CARPENTER.

***Timarcha tenebricosa*, Fab. in Co. Waterford.**—While on a visit to Mr. R. J. Ussher, I had the good fortune to secure a series of this interesting chrysomelid beetle, hitherto unrecorded from Ireland, though it has been taken by Mr. G. Garnett of the Newtown School, near Waterford. The specimens were taken on sea-cliffs near Stradbally. In Great Britain this species is, I believe, restricted to the southern counties. Irish coleopterists may expect some interesting discoveries when the south coast has been systematically worked.—H. LYSTER JAMESON, Killencoole, Co. Louth.

MOLLUSCA.

Additions to the Shell-fauna of Cork.—Judging from Dr. Scharff's useful and interesting list of Irish Land and Freshwater Mollusca (*I. N.* vol. i.) the records of additional species from this district since the publication of Mr. Humphrey's list in 1843, must be few and far between. I, therefore, record the following species, taken by myself during the past year within a radius of twenty miles from Cork city, none of which were included by Mr. Humphrey's in his enumeration of fifty-nine species:—*Hyalinia draparnaudi* occurs in my own and other gardens. I had taken it to be a large form of *H. cellaria*, until, on my sending a specimen to Dr. Scharff, he identified it at once as *H. draparnaudi*. *H. pura*, *H. crystallina*, and *H. fulva*, are plentiful in the woods at Glanmire. *H. nitida* occurs in a marsh at Whitegate. *H. alliaria* var. *viridula* occurs in some plenty near Roche's Point, at which station the type seems to be absent. *Helix pygmaea* and *H. aculeata* are frequent in the neighbourhoods of Whitegate and Glanmire. *Vertigo pygmaea*, at Roche's Point, Cork Beg, and Ovens. *V. antiwertigo*, in a marsh at Whitegate. (*V. angustior* and *Succinea oblonga* have both been recorded from the south of the county). *Carychium minimum* is abundant in woods and marshes. *Limnaea auricularia* was recorded doubtfully by Mr. Humphreys; my specimens, taken from the lough of Cork, have been verified by Dr. Scharff. *Planorbis crista* occurs in Bennett's lough, near Mayfield, and in streams in Cork Park, along with *Valvata cristata* already recorded (*I. N.*, vol. ii., p. 112). The variety *alba* of *Acme lineata* seems as plentiful in Lota wood, Glanmire, as the type. I hope, later on, when time permits me to study our slugs and bivalves, to make at least a few other additions to our local list.—R. A. PHILLIPS, Ashburton, Cork.

Testacella scutulum, Sow.—Mr. W. F. de V. Kane has recently discovered this rare species in his garden at Kingstown. This is the first record for the County Dublin, and the third for Ireland, it having previously been found in Louth and Waterford. Mr. Kane mentioned to me that he had also found specimens of a *Testacella* in Drumreaskie demesne, Co. Monaghan, but he was not sure what species it belonged to.—R. F. SCHARFF, Dublin.

FISHES.

Basking-Shark (*Selache maxima*) on the Sligo Coast.—On the 5th inst. a splendid specimen of the Basking-Shark became entangled in the salmon-net of Mr. Kilgallan, at Aughriss, Co. Sligo, a short distance off the pier, and after a desperate struggle, in which it caused great damage to the net and ropes, was, by the united efforts of four boats, turned into shallow water on the sandy beach, where it was killed. The great fish was evidently full-grown, for it measured thirty feet in length.—ROBERT WARREN, Moyview, Ballina.

BIRDS.

Continental White Wagtail (*Motacilla alba*) in Co. Mayo.—On the 29th of April, when on the Island of Bartragh, Killala Bay, with Mr. H. Scroope, Junior, and his brother, we observed a Wagtail, having such a large patch of white on the sides of its neck and throat as to attract our attention, and on a nearer approach, the light grey back proved it to be the rare *Motacilla alba*. It flew off and joined another some yards distance, and having my gun, I secured one, which proved to be a fine adult male in perfect plumage.

Mr. H. Scroope, who visited Downpatrick Head a few days after, saw another bird near the ruins on the Head.—ROBERT WARREN, Moyview, Ballina.

Our Summer Migrants.—Rev. R. M. Miller kindly sends us a copy of an interesting and popular article, on our summer migrants, which he contributed to the *Clonmel Chronicle* for May 20th. Such attractive expositions of natural history should do good work, by increasing the number of those who know something of the feathered denizens of our woods and hedgerows, and therefore find pleasure in observing and protecting them.

Spring Migrants at Londonderry.—The very fine spring brought many of the migrants some days earlier than their usual dates. The earliest to reach us was the Chiffchaff, which was first heard on 26th March. Then the Willow-Wren appeared on 3rd April. The first Swallow was seen here on 5th April, although I did not notice them in any numbers until some ten days later. A few Sandmartins arrived on 4th April, and I noticed them in great numbers on the 6th, at one locality. The Wheatear was first seen at Inch on 9th April; I saw and heard the Whitethroat on 23rd April, and I heard the Sedgewarbler on same date. The Cuckoo appeared on 19th April, and I heard the Corncrake for the first time on the 20th April, but it was reported to have arrived here on 14th. The Swift arrived a week before its usual time. I saw a large flock of about thirty hawking over Derry quay on 5th May. Almost all these arrivals are earlier than last year's dates. The Cuckoo was very scarce here last year, not more than a quarter seemingly of the usual number reaching us. This season it is more than usually abundant.—D. C. CAMPBELL, Londonderry.

Arrival of Spring Migrants.—Seeing some notices in last month's *I. N.* of the early arrival of spring migrants, I wish to record that the Cuckoo was heard at Giants' Causeway on Easter Sunday, 2nd April, which seems to be exceptionally early for this bird. In Wm. Thompson's "Natural History of Ireland" the earliest mention of the arrival of the Cuckoo seems to be the 10th April. I saw the first Swallow this season on 5th April in Co. Derry.—ARTHUR J. COLLINS, Belfast.

On 24th April, the Night Jar (*Caprimulgus europæus*) was heard, *much earlier than usual*; it is abundant in this neighbourhood upon the hills, and can be heard before sunset simultaneously with the Thrush, Blackbird, Cuckoo, etc.—J. ERNEST GRUBB, Carrick-on-Suir.

Occurrence of the Osprey (*Pandion haliaëtus*, L.) and the Quail (*Coturnix communis*, Bechst.) in Co. Cork.—Mr. Rohu, taxidermist, Cork, has now in his hands for preservation a fine immature female specimen of the Osprey, shot at Old Dromore, Co. Cork, on the 11th May; also an adult female specimen of the Quail, shot at Trabulgan, County Cork, on the 7th May.—W. B. BARRINGTON, Cork.

Quails in County Dublin.—On the 6th June my heart was gladdened by hearing the well-known note of a bird which I had not heard in a state of liberty for several years. I refer to the call of the Quail. In recording the arrival of this bird, I bear in mind the possibility that the birds which I heard may have been imported and liberated in the neighbourhood. Of course there must always be this element of doubt in recording the occurrence of a bird which is annually imported in large numbers by game-dealers. I have made careful inquiries in the neighbourhood, however, and have failed to obtain any evidence of birds having been liberated, and, having regard to the number of birds that may be heard calling in districts far apart, I have arrived at the conclusion that a true migration of Quail has occurred. It is well known that these birds were obtained in several parts of England last year, and I have good authority for stating that some were obtained in the County Wicklow at the same time. On looking up old shooting diaries, I find I shot my last Quail in the year 1876, which is probably the last year they were with us. I trust that after this long absence from our shores, they will be protected by both naturalists and sportsmen.—J. J. DOWLING, Foxrock.

Re-appearance of Quails near Londonderry.—After an absence of many years the Quails have visited us once more. They have been calling all over this district for the last ten days, and Mr. John McConnell reports them also from Inch. So far as I know, they have not been seen or heard for upwards of twelve years, except in July, 1892, when Mr. Milne heard the call-note once. I have not heard of their breeding in this neighbourhood since 1874. In that year we obtained eggs from two nests. I believe they are nesting with us this year.—D. C. CAMPBELL, Londonderry.

Stock Doves (*Columba ænas*) in Co. Wicklow.—Mr. E. C. Barrington writes (*Zoologist* for May) that he has observed a pair of Stock Doves among some rocks about six miles south of Powerscourt Waterfall, presumably nesting. We are glad to know that these birds are maintaining their ground in Co. Wicklow.

Supposed Iceland Gull at Londonderry.—From Mr. D. C. Campbell's description of the gull, seen by him on the 11th April, the bird was evidently a Glaucous Gull. He says "about the size of a large Herring Gull, but body heavier." The Iceland is altogether a larger-winged, *lighter-built* bird than the Herring Gull, and when seen together the difference of build is very obvious. The legs of the Glaucous and Iceland are the colour of those of the Herring Gulls.—ROBERT WARREN, Moyview, Ballina.

The Puffin (*Fratercula arctica*) in the Irish Midlands.—On Monday evening, the 22nd May, a lad brought me a living specimen of the Common Puffin, which he said had walked into a cottage beside a lake close to this demesne, called Quig lough, and though tame enough in its demeanour, it would not eat the food offered. They had kept it for some thirty hours before they decided to bring it to me; unfortunately before I could get any small fish it died. I have sent it up to the Dublin Museum, as it is a remarkable instance, I think, of a sea-bird so far inland. I presume it was making for its breeding haunts.—W. F. DE V. KANE, Drumreask, Monaghan.

***Chionis alba*, Lath.**—I am interested to see a paper in the June number of the *Irish Naturalist* on the occurrence of *Chionis alba* on the Irish coast, as I had an opportunity of witnessing the bird in its native haunts in the Straits of Magellan, between twenty and thirty years ago, and I published a short paper on some points in its anatomy in the "Journal of Anatomy and Physiology" for 1869. The flight of the bird, as I saw it, was not unlike that of a pigeon, and the Blue-jackets, the first time we encountered it, mistook it, not unnaturally, for a pigeon. Like some other observers who have handled specimens, I did not observe anything peculiar as regards its odour. The capture of a specimen on the coast of Ireland is certainly a very odd circumstance, and I cannot but think that the individual must have escaped from captivity somewhere.—ROBERT O. CUNNINGHAM, Belfast.

MAMMALS.

A Marten (*Mustela martes*) in Co. Antrim. A few days ago a fine specimen was trapped near Portglenone, Co. Antrim, by Mr. R. A. Alexander. The specimen is a male, and measures 2ft. 9in. in length. The "Marten Cat" as it is popularly called, is getting so rare in Ulster that the capture is worthy of record.—J. A. B. in *Land and Water*, April 22nd.

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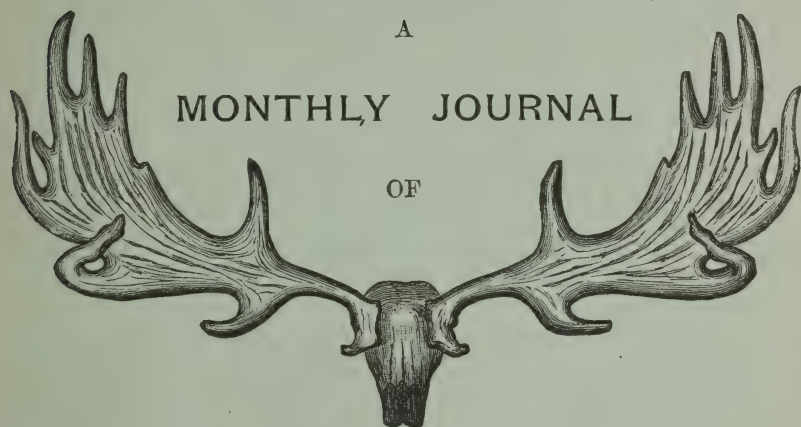
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AUGUST, 1893.

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The Irish Naturalist



GENERAL IRISH NATURAL HISTORY

AND THE OFFICIAL ORGAN OF THE

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AND

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AUGUST, 1893.

No. 8.

AMERICAN BIRD-VISITORS TO IRELAND AT HOME.

BY W. E. PRAEGER, OF KEOKUK, IOWA.

III. THE YELLOW-BILLED CUCKOO (*Coccyzus americanus*).

LONG will my first spring in America be the best remembered of springs to me. I had spent the winter in Iowa, an unusually severe and long-continued winter, and at last the hot sun had melted the snow, and the thick ice on pond and river had broken up, and rapidly the lately silent land was filled with sights and sounds, to me new and strange. And so, week after week it continued; daily new flowers, insects, and reptiles sprang into life again, while from the south the great stream of migration brought the birds in ever increasing number and variety. It can well be imagined what surfeit of surprise, wonder, and interest, the shortest country walk afforded under such circumstances.

Perhaps the most noticeable sound to me was a note heard in the woods and resembling the word "cow," often repeated, at first rather slowly, gradually getting quicker, but the last three or four notes suddenly becoming longer drawn out than any of the preceding ones. It sounded as if it might be the note of some gallinaceous bird, but it was no more like any bird's note that I had ever heard, than were those of many of the insects and frogs that made the woods resound with their extraordinary spring love-songs; and indeed I have since read that the note in question is very similar to that of the Burrowing Owl of the western prairies, and also of the Spade-footed Toad. After awhile I caught occasional glimpses of the mysterious originator of the sounds, and was told that they

were the notes of the "Raincrow," but this did not enlighten me much until I shot one of the birds from the upper branches of a tall hickory tree, and picked up what I easily recognised to be a Yellow-billed Cuckoo.

The right of the Yellow-billed Cuckoo to a place on the Irish list rests on the occurrence of two examples shot many years ago, in Co. Cork and Co. Dublin. The bird has also occurred four or five times in England, and also in Continental Europe, so that we have an unusual number of instances of this American bird crossing the Atlantic.

This bird's breeding range is the United States; it hardly passes north of the Canadian boundary line, and is found from ocean to ocean, though rather scarce west of the Rocky mountains. It probably leaves this country altogether in winter, and comes north in the spring after the trees are in full leaf, arriving in this latitude during the first week of May. Like the European Cuckoo, its presence is chiefly known by its note, for the bird is very shy, and manages to conceal itself among the densest foliage of the larger trees; but wherever there are trees, it is sure to be found, even round farm-houses, or in the city parks, or tree-lined streets. Looking at the stuffed skin in a cabinet, one can hardly believe how inconspicuous the bird is in its native haunts. The long slender build and brown colour make it look like one of the many branches with which it is surrounded, and seen from below, the white breast and spots on the tail feathers become mere glints of sunlight among the foliage. Not infrequently, after the observer has been peering into a tree in search of some noisy warbler in the upper branches, a slight movement will betray to him a "Raincrow" close at hand, and the bird will likely remain, with unusual composure for one that can boast of a stature of over twelve inches, and give plenty of time for mutual observation. It is always more secretive than shy; a proof that it knows its colours are protective.

The Yellow-billed Cuckoo builds its nest in a bush or low tree; it is a slight affair of sticks, not well made nor concealed with much art. The eggs are from four to six, rarely eight in number, and of a pale greenish-blue. They are usually laid in June, but oviposition is curiously irregular, eggs in all stages of incubation, and even young birds in various stages of development, being often found in the same nest. A satisfac-

tory reason for this habit seems unknown as yet, as with the still more curious parasitic habits of many of the Old World Cuckoos, with which it has probably some connection. Though not parasites, there seem to be well authenticated instances of an egg of the American Cuckoo being slipped into the nest of some other bird. During the nesting season, both birds are very solicitous as to the safety of the nest, and in caring for the young.

The favourite food of this bird seems to be caterpillars, and most stomachs I have examined were well filled with them; it also eats other insects, and may sometimes be seen on the ground picking up grasshoppers; in the fall it occasionally indulges in fruit, and berries of various kinds. It has been accused of robbing other birds' nests, but whether with any more justice than in the case of *Cuculus canorus* I do not know.

The common name for both our species of Cuckoo is "Rain-crow" because their call is said to foretell rain; such widespread popular beliefs are apt to have a basis of truth, but the call is heard during dry weather as well as wet, and the mating season, when they are most noisy, is also the most showery time of year. From the call, the name "Cowbird," is sometimes given to them, but they must not be confused with the true Cowbird, a member of the American family *Icteridæ*, and which is, I believe, the only bird besides some of the cuckoos that is known to be parasitic in its habits.

Above, this bird is a bright olive-brown, with a peculiar satiny gloss showing a greenish tinge in some lights; below, pure white, excepting the two central feathers, which are like the back. The tail becomes almost black, with broad white tips; the wings have a patch of light chestnut, not very noticeable till the wing is opened; the bill is yellow at the base and below.

IV. THE BLACK-BILLED CUCKOO (*Coccyzus erythrophthalmus*).

THE Black-billed Cuckoo introduced himself to the fauna of Europe by turning up at Lucca, Italy, in 1858. On only one other occasion has his name appeared as a visitor to Europe, when he claimed for himself the right to an article in his honor in the *Irish Naturalist*, by appearing at Killead, Co. Antrim, on the 25th September, 1871.

After what has been said above on the Yellow-billed Cuckoo, our present subject can be dismissed with comparatively few words. The two species are so alike in appearance and habits that to point out some of the differences is all that will be necessary. The birds are commonly confused by unscientific observers, and cannot be distinguished except at very close quarters. The subject of the present sketch is rather the smaller of the two, he lacks the chestnut on the wings, and the black and white of the lateral tail feathers is restricted and obscure, with no bold contrasts between the colours; the bill is plumbeous and black, instead of yellow and black; the eyelids are red, hence the unwieldy specific name. Otherwise the plumage of the two birds is alike, so that when the wings and tail are closed one has to be near enough to distinguish the colour of the bill or eyelid to be certain as to the species.

In nesting habits the same close relationship is noticeable. The nest is similar, but the Black-billed more frequently builds in low situations, such as bushes. The eggs can usually, but not always, be distinguished with certainty; they are smaller, rounder, and deeper-coloured than the Yellow-billed's eggs. For comparison we give the measurements of eggs of the two species:—*C. americanus*, length 1.10 to 1.40, breadth .83 to .98, *C. erythrophthalmus*, length, 1.05 to 1.15, breadth .80 to .90. The same irregularity as to time of laying is noticed in both species.

The cry of this bird is said to be less harsh and not so often repeated as that of its near relative. Its habits, such as flight, movements, food, time, and rapidity of migration, and localities it most frequents, are very similar. There is, however, a decided difference in geographical distribution, the Black-billed being found only east of the Rocky mountains; but what it lacks in longitude it gains in latitude, as it ranges up into even Labrador, and is the only species found through most of the British possessions.

There is certainly a great absurdity in admitting a bird that has only once occurred in Ireland as a straggler, to the Irish list. While the occurrence is highly interesting, yet the inclusion of such names in a fauna are confusing and misleading. Two species of the genus *Coccyzus* are in the Irish list, and the same two in the Iowa list, and yet to say that the genus *does* occur in Iowa, and *does not* in Ireland is nearer the truth.

But absurd as the rule may be that entitles a bird once captured in a supposed wild state to a place in the fauna of the country, it seems to be the only rule that is workable. No two ornithologists would quite agree as to how often and under what circumstances a bird must occur to be admitted into the exclusive circle. And the probability of a bird being aided by resting on ships should not affect its standing, even if it could be proved that it did so. A favourite way of accounting for the present distribution of reptiles is that they or their eggs were carried to distant lands in hollow logs; and what is your Atlantic liner but a hollow log somewhat developed and specialized. It is useless for naturalists to make laws as to the means and methods which organisms are to use in spreading their species on the face of the earth, and we might speculate long and uselessly on what great results might spring from such accidental wanderings, and how they might affect the fauna or flora of a country, with all its sensitive interdependence. What small fortuitous occurrences often produce great results, and how little the means that brought them about matter. Is Ireland any less the land of saints because St. Patrick sailed over on a paving stone?

THE SHAMROCK: A FURTHER ATTEMPT TO FIX ITS SPECIES.

BY NATHANIEL COLGAN.

ON the approach of last Saint Patrick's Day I was induced, chiefly by the kind offer of assistance made me by the editors of this Journal, to take in hands once more the inquiry into the species of our national badge, begun some years earlier, with the results detailed in the issue for last August. A notice to subscribers was accordingly inserted in the March number of this year, so framed as to ensure that all specimens sent in response should be certified as genuine by competent authorities, while, at the same time, as a provision against a not improbable lack of interest in the subject amongst the subscribers to the *Irish Naturalist*, some three dozens of circulars were prepared and sent by post to selected points in the Irish-speak-

ing districts, chiefly along our western sea-board. These circulars, in almost all instances, were addressed to Roman Catholic parish clergymen; and, as I had fully expected, the percentage of replies they brought me was very much larger than in the case of the printed notice.¹ Of the circulars, twenty per cent. were answered, a proportion not far short of expectation. As for the printed notice distributed through the agency of the *Irish Naturalist*, I cannot presume to say exactly how small the percentage of answers may have been. Out of the whole body of subscribers, however, only eight forwarded specimens of Shamrocks; but, of these, one sent no less than five, another, four, and a third, three specimens, each certified as genuine by a distinct authority.

In addition to the plants thus secured, Mr. F. W. Burbidge, Director of Trinity College Botanic Garden, supplied me with a root, certified by one of his gardeners, a Tipperary man, as the real Shamrock, and part of the stock grown in the Gardens, and supplied as such to English inquirers; another specimen was bought from an advertiser in the Co. Louth, who offered the plant for sale, at a not unprofitable price, "as the true Irish variety," and, finally, three specimens were bought in Dublin on the 17th March as real Shamrock, from three different itinerant vendors, each of whom was required to exercise the most scrupulous care in the selection of the genuine plant from the obviously miscellaneous collection in her basket.²

Altogether, thirty-five Shamrocks were secured and carefully planted and labelled, after they had been provisionally

¹ I wish to express my thanks here to the following correspondents for their kindness in sending specimens from their respective districts:—Rev. T. O'Connor, Kilrosanty, Waterford (three plants); Rev. T. McGrath, Clogheen, Tipperary; Rev. P. MacPhilpin, Aranmore, Galway bay; Rev. P. Brennan, Corrigaholt, Clare; Rev. P. O'Keane, Easky, Sligo; Rev. P. Kelly, Ardara, Donegal (two plants); Mr. Michael Costello, Inisheer, Galway bay (two plants); Miss A. N. Abbott, Cork (three plants); Mrs. Delap, Valencia island, Kerry; Miss Garner, Dublin; Miss Kinahan, Dublin (plant from Ramelton, Donegal); Mrs. Leebody, Londonderry (four plants from counties Donegal, Derry, and Tyrone); Mr. A. J. Collins, Belfast; Mr. M. Comerford, Dundalk; Mr. T. Hunter, Ovoca, Wicklow (five plants); Mr. Owen Smith, Meath; and Mr. J. J. Wolfe, Skibbereen, Cork.

² These three plants matured into three distinct species, *Medicago lupulina*, *Trifolium repens*, and *T. minus*.

classified according to species. A study of the minuter distinctions of *Trifolium repens*, *T. minus* and *Medicago lupulina*, made it possible to carry out the classification with confidence even in the undeveloped stage in which most of the specimens reached me. In no single instance, indeed, in which the plant survived up to the flowering and fruiting season, (and only two out of the total of thirty-five succumbed to the extraordinary dryness of the remarkable spring and early summer of this year), was this provisional classification found in error; so that my Patrick's Day determination of these two as *T. repens* and *T. minus*, respectively, may be accepted as accurate.¹ Of the surviving thirty-three plants, all had flowered and many had fruited by the 23rd June, *T. minus* in all cases keeping well ahead of *T. repens*. By the end of June the entire crop of Shamrocks, or, at least, specimens of the thirty-three plants of which it was made up, was harvested and garnered, that is to say, dried, mounted, and labelled, for the satisfaction of obstinate adherents of *Trifolium repens*.

The results of this harvest may be most clearly shown in tabular form, thus:—

19 Shamrocks matured into <i>Trifolium repens</i> .				
12	„	„	„	<i>T. minus</i> .
2	„	„	„	<i>T. pratense</i> .
2	„	„	„	<i>Medicago lupulina</i> .

It will be seen that the results of this year's inquiry shows, contrary to my expectation, a decided preponderance in favour of *T. repens*. But if we add in the results of the former inquiry, the balance between the two species is almost redressed. Out of a total of forty-nine certified Shamrocks grown on the two occasions, twenty-four proved to be *Trifolium repens*, and twenty-one *T. minus*, the remainder being equally divided between *T. pratense* and *Medicago lupulina*. Arranging the Shamrocks by counties so as to exhibit the area over which the use of the different species was found to prevail, we have the following table:—

¹ In the earlier stages of growth, the mucro to the leaflets of *Medicago lupulina* seems to me to afford the safest and readiest distinction between that species and *T. minus* and *T. repens*. There is little difficulty at any stage in separating *T. pratense* from the three other competitors.

TABLE SHOWING THE SPECIES OF SHAMROCK USED IN VARIOUS IRISH COUNTIES.

<i>Trifolium repens</i> is used in	<i>T. minus</i> is used in	<i>T. pratense</i> is used in	<i>Medicago lupulina</i> is used in
Armagh. Carlow. Cork. Derry. Dublin. Galway. Waterford. Wicklow. Antrim. Tyrone. Kerry. Donegal. Meath. Sligo. Roscommon. Mayo.	Armagh. Carlow. Cork. Derry. Dublin. Galway. Waterford. Wicklow. Clare. Louth. Tipperary. Queen's Co. Waterford.	Waterford. Wicklow.	Cork. Dublin.

Here again the employment of *T. repens* as the national badge would appear to be more extended than that of *T. minus*, the former being used in sixteen, the latter only in thirteen of the Irish counties. But there is further evidence forthcoming on the side of *T. minus*; for Mr. James Britten, editor of the *Journal of Botany*, gives the following strong testimony in its favour, in a valuable note on the Shamrock in the *Dictionary of English Plant Names* (p. 425).¹

“At the present day, *Trifolium minus* is the plant most in repute as the true Shamrock; it is this species which forms most of the Shamrock sold in Covent Garden on St. Patrick's Day, and in Ireland it is used as such in the counties of Antrim, Down, Meath, Fermanagh, Dublin, Wicklow, Carlow, Westmeath, Wexford, Limerick, Waterford, Cork, and Kerry.”

When entering on this inquiry some five years ago, I was quite unaware of the existence of this interesting contribution to the subject, which only came under my notice so late as the April of this year. Had I known of these previous researches, by which the results recorded in these pages were so largely anticipated, I should probably have thought it unneces-

¹ Published by Trübner & Co. (for the English Dialect Society), London, 1886. All who are interested in the obscure history of the Shamrock are strongly recommended to read Mr. Britten's note, which gives, in condensed form, the fruit of much antiquarian research.

sary to make further investigation, so that my ignorance of Mr. Britten's paper has had the result of strengthening the case for *T. minus*, which, as I believe, he was the first to make out. Though Mr. Britten does not tell us that *T. minus* is exclusively used as the Shamrock in the thirteen counties covered by his inquiry, the evidence he has brought forward, coupled with that given in these pages, fully warrants, in my opinion, the conclusion that *T. repens* can no longer claim pre-eminence as the true Irish Shamrock.¹ It must hereafter be content to share the honour, at least evenly, with its rival *T. minus*. Future writers and editors of English and Irish Floras, if they aim at accuracy in their popular plant-names, must bracket these two species of *Trifolium* under the name Shamrock and must give, too, to Mr. Britten the credit of having been the first to clearly discern and boldly advocate the strong claims of *T. minus*.

While conceding that in the present day the neater *Trifolium minus* is equally in favour with *T. repens* as our national badge, some may be disposed to argue that the true Shamrock of earlier times, before modern culture had spread abroad a taste for the elegant and the delicate, was, nevertheless, the coarser *T. repens*. The fact that a decided majority of the specimens collected by me from the Irish-speaking districts of our island, where old national usages may be assumed to have the greatest tenacity of existence, belonged to this latter species, might be taken as lending a certain support to this view. But the discussion of such antiquarian aspects of the question, however fascinating it might be as opening up wide fields of speculation and inquiry, cannot properly find a place in the pages of a natural history Journal. I must content myself, then, with this endeavour to place clearly before those interested in the subject the available evidence as to the species of the modern Shamrock, leaving it to others, who may feel dissatisfied with the mass and tendency of this evidence, to pursue the inquiry still further on the lines laid down.²

¹ There is no reason why the name should not be written *shamroge*, as it is pronounced by Irishmen, and written by many of the earlier English writers.

² Taken together, Mr. Britten's inquiry and my own have covered twenty-five out of thirty-two Irish counties. The following counties still remain outside the inquiry:—Cavan, Kildare, Kilkenny, King's County, Leitrim, Longford, and Monaghan.

THE FLORA OF COUNTY ARMAGH.

BY R. LLOYD PRAEGER, B.E., M.R.I.A.

(Concluded from page 184.)

- Millium effusum**, Linn. N. — S.
Killooney near Armagh, W. F. J. spec.! Ivy Lodge near Newry,
H. W. L. spec.!
- Calamagrostis hookeri**, Syme. N. — —
Abundant in a low meadow by the side of Lough Neagh, near
the entrance of the Lagan canal, R. Ll. P. The plant grows
plentifully here, over an area of perhaps a couple of acres, among
Lythrum, *Lysimachia vulgaris*, and *Phragmites*; in a space of a few
square yards I gathered 200 stems. Considering its very limited
distribution, which in Great Britain is confined to Lough Neagh,
its disappearance in some of its stations there, and its extreme
rarity in the others, the discovery of a new locality in which it is
abundant cannot but be highly satisfactory. More's note (*N. H. R.*)
refers, as stated in *Recent Additions* (*Jour. Bot.*, 1873) to Scawdy island,
in Tyrone; the plant has not been previously found in Armagh.
- Agrostis vulgaris**, With., var. **pumila**, Lightf. — — S.
Dry field at Cam Lough, and on G. N. railway south of Newry,
R. Ll. P.
- A. alba**, Linn., var. **stolonifera**. — — S.
Muddy shores of Newry river, R. Ll. P.
- Alra flexuosa**, Linn. — — S.
Frequent on the southern hills; not observed elsewhere in the
county, R. Ll. P.
- Trisetum flavescens**, Beauv. N. — —
A member of "the natural herbage of the soil," *Cooté's Armagh*.
Mullinure, W. F. J. spec.! Armagh, S. A. S. Lurgan, Portadown,
Retreat, Navan Fort, and Eglish, being frequent in the limestone
district, R. Ll. P.
- Avena pubescens**, Linn. N. — —
Quarries at Navan fort, R. Ll. P.
- Poa compressa**, Linn. N. — —
Bank by roadside, half a mile from Portadown towards Lurgan
(McMillan), More's *Recent Additions* (*Jour. of Bot.*, 1873).
- Sclerochloa maritima**, Lindl. — — S.
Estuary of Newry river, R. Ll. P.
- S. distans**, Bab. — — S.
Shore near Narrow-water, R. Ll. P.
- S. rigida**, Linn. N. M. S.
Gravel-pit east of Grange near Armagh; on the Armagh and
Goragwood railway south of Drummamore lough, and near
Loughgilly; abundant on the G. N. main line and walls adjoining
at and north of Wellington cutting near Newry; wall of the
platform at Goragwood station, R. Ll. P. Frequent in Armagh,
growing chiefly on railway tracks, where no doubt the dry
gravelly material is the attraction. It is extremely rare in district
12, common in district 5.
- Briza media**, Linn. N. — —
Loughgall (More), *Flor. Ulst.*! and subsequently, B. N. F. C., S. A. S.,
etc. Mullinure, W. F. J. spec.! Navan fort, S. A. S.! Loughna-
shade, Eglish church, Killylea, Middletown, roadside south of
Armagh, R. Ll. P. Frequent in the limestone district; not met
with elsewhere.

- Catabrosa aquatica**, Beauv. N. M. S.
Tanderagee lower demesne, and by the canal near Newry! H.W.L.; by the railway between Lurgan and Portadown; English crossroads; ditch near Clare Castle S.W. of Tanderagee; Straghan's lough near Keady, R. Ll. P.
- Festuca sylvatica**, Vill. — M. —
On steep banks by the Cusher river in Tanderagee lower demesne, R. Ll. P.
- Bromus sterilis**, Linn. N. — —
Loughgall (More) *Flor. Ulst.*! Roadside near Navan Fort, R. Ll. P.
- ‡**B. commutatus**, Schrad. N. — —
Tartaraghan, probably introduced with grass-seed, More *N.H.R.* Mullinure meadows near Armagh, W. F. J. spec.!
- Triticum caninum**, Linn. — M. —
By Mullaghmore lake S. W. of Markethill; rare in the county, R. Ll. P.
- Hordeum pratense**, Hudson. N. — —
Mr. Stewart's herbarium contains specimens of this rare grass, collected by G. R. at Tartaraghan in 1880.
- Lepturus filiformis**, Trin. — — S.
By the canal locks below Newry, and on the shore abundantly at County bridge near Narrow-water, R. Ll. P.
- Polypodium phegopteris**, Linn. — — S.
Frequent on the N.E. slope of Slieve Gullion (Lett), *Ferns of Ulster* (B. N. F. C. 1885-6, App.) Mr. Lett informs me that it was in the woods near Killeavy church that he found the Beech Fern; I did not meet with it on the north or west slopes of Slieve Gullion.
- Lastrea oreopteris**, Presl. — M. S.
On Ferry Hill above Narrow-water (R. Ll. P.), *Ferns of Ulster*; I found it in the woods there in 1881, and saw it again in 1892. One fine plant in a wood in Tanderagee upper demesne, R. Ll. P.
- L. æmula**, Brack. — — S.
Plentiful on Ferry Hill above Narrow-water (R. Ll. P.), *Ferns of Ulster*.
- Polystichum aculeatum**, Roth. N. M. S.
Near Loughgall, but rare, More *N. H. R.*! On Ferry Hill above Narrow-water (R. Ll. P.), and near Tynan (Phillips), *Ferns of Ulster*. Near Armagh, W. F. J. spec.! Castlerow near Loughgall, roadside at Beech Hill House near Armagh, English cross-roads, lanes near Tartaraghan church, lanes east of Tynan, Marlacoo lough, and near Pointzpass, R. Ll. P.
- Cystopteris fragilis**, Bernh. N. — —
Bridge near Armagh (McCrum), *Ferns of Ulster*. Recently seen on the bridge in question, which is at Tassagh near Keady, by W. F. J.
- Ceterach officinarum**, Willd. N. — S.
Wall of Lurgan demesne, and near Bessbrook (Lett), *Ferns of Ulster*. Ballynahone House garden wall, and on the walls of Armagh observatory, courthouse, and gaol, W. F. J. spec.! Bridge over Ulster canal two miles north of Caledon, R. Ll. P.
- Hymenophyllum tunbridgense**, Sm. — — S.
In a glen on Ferry Hill above Narrow-water (R. Ll. P.), *Ferns of Ulster*. Found there in 1881, and re-found in 1892. The stream on whose banks it grows forms the boundary of Armagh and Louth, and the record strictly belongs to districts 10 and 5.

Osmunda regalis, Linn.

N. — —

"The Rev. G. Robinson showed me what might be called a small forest of this fine plant, not far from Maghera, where it forms large *tussacs*, like those of *Carex paniculata*; drainage is, however, gradually destroying it" (Dickie), *Flor. Ulst.* Bog at south end of Lough Neagh (Templeton), *Ferns of Ulster*. Near Maghera, B. N. F. C., 1871. "Near Tartaraghan, Rev. G. Robinson!!!" More *N.H.R.* Not now anywhere so abundant or luxuriant as described by Dr. Dickie, but still frequent on the northern bogs: I found it in a number of places on bogs from Maghera to Lurgan, and also thrown up by the waves on the shores of Annagarriff lake, where it evidently flourishes in security on the islands; also on a bog south of Portadown; often in some abundance, but generally rather stunted, R. Ll. P.

Botrychium lunaria, Sw.

N. — —

One plant on top of Navan fort, W. F. J.: I have not seen Mr. Johnson's specimen, which was not preserved, but he is satisfied that it was right: I failed to refind it at Navan, R. Ll. P. Shore of Lough Neagh at Ardmore, H. W. L. spec.!

Ophioglossum vulgatum, Linn.

N. — —

Loughgall near the lake, More *N. H. R.*! Armagh (Kinahan), *Flor. Ulst.* Ardmore near Lurgan; abundant in short grass on the shores of Lough Neagh, where it is under water for four winter months (Lett), *Ferns of Ulster*. Tartaraghan, B. N. F. C., 1877. Mullinure and Drummanmore near Armagh, W. F. J. spec.!

Bird island on Lough Neagh shore, R. Ll. P.

Isoetes lacustris, Linn.

— M. S.

County Armagh, *Cyb. Hib.* In Cashel lake west of Slieve Gullion (444 feet elevation); and at the west end of Lough Ross near Crossmaglen (286 feet), and on east shore of Mullaghmore lough (200 feet elevation), June, 1893, R. Ll. P.

Lycopodium selago, Linn.

N. M. S.

Very rare; one plant on bog north of Churchhill (under 100 feet); summit of Carrigatuke (1,200); and sparingly on Camlough mountain, R. Ll. P.

Selaginella spinosa, Beauv.

— — S.

On Camlough mountain at about 700 to 1,000 feet, R. Ll. P.

(Pilularia) globulifera, Linn.

[N.] — —

Abundant in marshy ground two miles from the mouth of the Blackwater, near Lough Neagh (Campbell), *Flor. Hib.* and *Flor. Ulst.* This station may be in Armagh, or in Tyrone, but is not in district 12, as given in *Cyb. Hib.* I did not meet with the plant, and it is apparently one of these which the drainage of Lough Neagh has forced from its former habitats.)

Chara fragilis, Desv.

N. — —

Lough Neagh at Ardmore Glebe (f. *delicatula*) and Bird island, H.W.L. spec! In Lough Neagh at Ardmore Point (form approaching *delicatula*), and at Maghera; pool beside Derrylileagh lake; lake at Tynan Abbey; and bog-holes south of Portadown (form with prominent primary cortical cells), R. Ll. P.

C. aspera, Willd.

N. — —

In Lough Neagh at Derryadd Bay; Ardmore Point (f. *lacustris*), and Maghera (f. *subinermis*); quarries near Navan fort, R. Ll. P. *C. aspera* f. *lacustris* and *C. fragilis* f. *delicatula* grow abundantly in shallow water on the gravelly shores of Lough Neagh, where they may be observed covering the bottom with short bright green tufts. After storms they are cast ashore in large quantities, mixed with *Nitella opaca*.

Chara polyacantha, Braun. N. —

Plentiful in Loughgall lake near the boat-house and elsewhere, and in quarry-holes at the eastern extremity of Loughgall manor demesne, R. Ll. P. This handsome plant has not been previously found in Ulster.

C. hispida, Linn. N. —

Drains at Loughgall near Armagh, quarry-holes at Navan Fort (f. *rudis*), north of Loughgall (f. *rudis*), at Grange near Armagh, and at east end of Loughgall manor grounds (f. *rudis*); plentiful also in Loughgall lake (f. *rudis*).

C. vulgaris, Linn. N. — S.

Lough Neagh at Bird island, H. W. L. spec.! Pool at Mullinure near Armagh, quarries at Navan Fort (f. with prominent secondary cortical cells), quarry-hole at Drummanbeg near Armagh, shallow water by railway near Richhill, quarry-holes south of Armagh, lake at Tynan Abbey, quarry-holes north of Loughgall, and by the railway at Wellington cutting south of Newry, R. Ll. P. The commonest *Chara* in the county; it appears to be more amphibious than most of the species, frequently growing in water only a few inches deep, where it is never completely submerged.

C. contraria, Kuetz. N. —

In Lough Neagh at Croaghan island, H. W. L. spec.!

Nitella translucens, Ag. — — S.

Abundantly in Cashel lake near Crossmaglen (447 feet elevation), R. Ll. P. *Isoetes lacustris* grows in the same lake.

N. flexilis, Ag. — — S.

Abundant in the Camlough river between the lake and the village, R. Ll. P. Not hitherto recorded from Ulster.

N. opaca, Ag. N. M. —

In Lough Neagh at Bird island! and Ardmore Glebe! H. W. L. Plentiful along the Lough Neagh shore; quarry-holes north of Loughgall, in a well near Markethill, and in Clay lake near Keady ("probably"), R. Ll. P.

ADDENDA ET CORRIGENDA.

Page 15. Mr. H. C. Hart writes (*J. N.* 1893, p. 84), that he considers the estimate of the flora of Donegal here given (about 720 species) to be too low.

„ 37. Line 20. For 104 read 106, and in the list which follows add *Elatine hexandra* after *Diplotaxis muralis* on p. 37, and *C. binnensis* after *Crepis nicoensis* on p. 38.

„ 38. Line 31. After the words "Rev. G. Robinson," add "one by Mr. A. G. More."

„ 94. After *Elatine hydropiper* add

E. hexandra, DC.

— M. —

Eastern margin of Mullaghmore lake, R. Ll. P., June, 1893.

„ 159. Line 31. For "Lagan Canal" read "Newry Canal."

Note—Montiaghs or Moyntaghs, pronounced "Munches" (Celtic *Moin-teach*, a boggy place), is the name of a parish bordering on Lough Neagh in the extreme N.E. of the county, but the name appears to be locally applied to the whole of the northern bog district.

THE EARTHWORMS OF IRELAND.

BY REV. HILDERIC FRIEND, F.L.S.

(Continued from page 191.)

HITHERTO no attention whatever seems to have been paid by British naturalists to that group of worms whose principal habitat is the old and decaying stumps or trunks of fallen trees, and whose chief service consists in the breaking up of useless timber, and reducing it to a vegetable mould. When I commenced the study of these animals two years ago nothing was known of the subject in this country, and I was therefore compelled to examine the works of such continental naturalists as Eisen, Rosa, and Levinsen, in order to ascertain the character of those tree-worms which had already been made known to the scientific world. Thanks to their industry, it has been possible for me to identify every species hitherto discovered in Great Britain. So far as present research enables us to speak definitely on the subject, we have no tree-worms peculiar to this island. Every species hitherto examined is known to occur in one or other of the countries of Europe, from Russia and Scandinavia to Brittany and the Italian peninsula.

But though it has not fallen to the lot of our countrymen to add any species of arboreal worm to the list of new discoveries, it must be admitted that foreign writers on the subject have, so far, almost without exception, failed to recognize the affinities of the group, and present us with any satisfactory system of classification. I purpose therefore, in the present paper, giving the whole subject a careful revision in the light of our indigenous species, with this proviso, however, that when our boreal and Irish species have been as carefully worked as I have worked those found south of the Clyde, it may be necessary to somewhat modify the characters of the group.

Eisen was the first naturalist to show that the worms which were formerly included in the genus *Lumbricus* were marked by such differences as would justify the creation of new genera. He accordingly, in 1873, took the family *Lumbricidæ* and split it up into four genera—*Lumbricus*, *Allolobophora*, *Dendrobæna*,

and *Allurus*. He has since added *Tetragonurus*. The curious point to be noticed is, that though Eisen created the genus *Dendrobæna*, he did not recognize the species which would naturally fall under that generic designation, and hence his perfectly natural and appropriate term has been quietly ignored. It is my purpose, therefore, to revive the term first introduced by Eisen, and to show which of the species hitherto placed under *Lumbricus* and *Allolobophora* must be transferred to the subgenus *Dendrobæna*.

In revising Eisen's genus, however, it will be necessary to extend the characters considerably, since he included therein only one species, and that, till now, a very badly described and little understood worm. His diagnosis is as follows:—

Dendrobæna, n. gen.

Tubercula ventralia in segmento 14 [= 15 Eng. method].

Setæ ubique æquo intervallo distantes, exceptis duabus summis, quarum intervallum aliquanto majus est.

Lobus cephalicus tres partes segmenti buccalis occupans.

Referring to this subject, Dr. Benham says:—"Eisen was the first to subdivide the genus *Lumbricus* into subgenera, according to the relative amount of dovetailing of the prostomium into the peristomium. This is accompanied by certain other characters, which have been held sufficient to characterize genera in other cases. So that I have retained his subdivisions *Lumbricus* and *Allolobophora*; but as his genus *Dendrobæna* is only distinguished from the latter genus in having all the setæ equidistant, and as all stages occurring in the separation are found in *Allolobophora*, I agree with Rosa that we ought not to recognize it."

Consequently the name has been dropped, and in Beddard's "Classification and Distribution of Earthworms," 1891, and Rosa's "Revisione dei Lumb.," 1893, is omitted from notice altogether. The statement of Benham to the effect that every degree of separation of the setæ is found in *Allolobophora* is true till we remove the species which properly fall under the genus *Dendrobæna*. Almost without exception do we find that the species of *Allolobophora*, as classified by Eisen, which have the setæ widely separated, are dendrobænic in character. It is true that I shall have to deal with one exception, but this is due to the fact that we are not yet acquainted with all the species that exist, and cannot therefore assign those with which we are familiar their exact position. The characters of the group will be better understood when the different species have been discussed. Generally speaking, however, we may say that the worms are rose-red or flesh-coloured, small, with setæ more or less widely separated, arboreal in character, or found usually in and about decaying timber or tree refuse.

We may take *Allolobophora celtica*, Rosa, as a type. Rosa's original description was based upon three living specimens received from Brest. in

Brittany, during the month of March, 1886. It may be here remarked that in England March is an excellent month for collecting earthworms, as the sexual organs are then becoming active and fully developed. Rosa states that the worms are about equal in dimensions to *Lumbricus purpureus*, Eisen; being from 2 to $2\frac{1}{2}$ millim. in diameter, and 35 to 40 in length. The form is cylindrical, with the posterior part somewhat attenuated. Colour violaceo-pallid dorsally, carneo-livid ventrally. Segments about 100 in number. Cephalic lobe or prostomium with a large backward prolongation which cuts or dovetails into the peristomium to about one-half its longitudinal diameter, the lobe being destitute of an inferior longitudinal groove. The male pore situated on segment 15, and extending from the second to the third seta, the two adjoining (14 and 16) being affected. Rosa terms these papillæ carrying the male pore the atria, but Beddard disputes the strict accuracy of this designation. I prefer for the present to state, when these glandular processes occur, that the male pore is carried by or borne on papillæ. The female pore is well seen, says Rosa, as a small fissure on each side of segment 14 against the second setæ, but on the side external to that occupied by the male pore. The girdle occupies six segments, extending over 31-36, slightly raised and not very closely fused. The *tubercula pubertatis* occur ventrally on segments 33, 34, in the form of a continuous ridge (not on papillæ as in *Allolobophora chlorotica*, for example). Setæ distant, the lateral increasing from below upwards, that is, the interval between 2-3 is greater than between 1-2, and less than that between 3-4; the ventral inferior (1-1) not greater than the lateral inferior (1-2); the dorsal interval (4-4) being about twice that of the lateral superior (3-4.) The setæ on the ventral surface of segments 31, 32, 35 (before and behind the *tubercula pubertatis*) borne on relieved papillæ. An interesting note on the nephridiopores, which need not be reproduced in this connection, brings Rosa's account to a close.

In 1890 I found three specimens of this worm a few miles north of Langholm, N.B., and the same year three others were discovered in an immature condition near Carlisle, when they were at first mistaken for the young of *Lumbricus purpureus*, Eisen. More recently I have received specimens from, or collected them myself, in Devonshire, Gloucestershire, Yorkshire, Northants, Lancashire, Lanark, Sussex, and several Irish localities. It is therefore evident that the species is widely distributed in Britain.

It only needs that this species should be studied by the side of *Allolobophora Boeckii*, the type upon which Eisen founded the subgenus *Dendrobæna*, to show that they are very closely allied. I will not at this point inquire what relationship exists between *A. Boeckii* and *Lumbricus pulex*, Hoffmeister. Eisen says the girdle is usually composed of five segments (29-33), over three of which (31-33) the *tubercula pubertatis* extend. I give the figures according to the English notation, which makes the peristomium the first segment, and places the male pore on the 15th. Eisen's description, published in 1870, is faulty, owing to the inclusion of two or three species under one name. The generic title adopted in 1873 was based upon the fact that the worm was found under the bark of

decaying trees. It has often been confused with another closely allied species which Eisen first differentiated under the title of *Allolobophora subrubicunda*. This worm is very widely distributed, and when once seen is not easily mistaken for any other, notwithstanding the fact that its girdle or clitellum occupies almost exactly the same position as that of one or two other species. It is true that the Gilt-tail (*Allolobophora subrubicunda*, Eisen) is by no means confined to woodlands, but its affinities are entirely with the *Dendrobæna*, and it specially delights to live among fallen and decaying leaves, dead branches of trees, and similar vegetable debris. I have found it depositing its egg-capsules quite under the bark of decaying trees.

When Eisen established the genus *Dendrobæna*, it is remarkable that he did not place therein his new species *Allolobophora arborea*. It is described as an arboreal or dendrobænic species, and its characters were in many respects so similar to those of his type of the new genus that at first we are astonished to find the two placed under different genera. The fault lay in the fact that Eisen placed too much stress upon one character, to the exclusion of the rest. With him, any worm whose prostomium cut the peristomium in two was a *Lumbricus*, whatever other characters it possessed. In *Dendrobæna* the prostomium occupied about three parts of the peristomium, while in *Allolobophora* the prostomium only slightly cut into or divided the buccal segment. It is now found that this is far too arbitrary and unnatural an arrangement, and that while undoubtedly every true *Lumbricus* has the peristomium completely divided by the hinder process of the prostomium, yet not every worm with this feature is a true *Lumbricus*. Want of attention to this fact has led to further confusion in the case of a recently discovered worm which Levinsen has described as *Lumbricus eiseni*. This worm, which was first described from specimens found at Copenhagen, has been obtained by Rosa in Italy, and by myself in various parts of Great Britain; and is a true *Dendrobæna*, notwithstanding the fact that it has the buccal arrangements of a typical *Lumbricus*. In colour and in the disposition of the setæ it somewhat closely resembles *Lumbricus purpureus*, Eisen, but there the resemblances end. The true *Lumbricus* has five or six girdle segments, in this worm there are eight or nine. In *Lumbricus* the *tubercula pubertatis* stretch across the four inner segments of the girdle; here they are absent, or if present their position is abnormal. In *Lumbricus* there are two pairs of spermathecae, in this worm they are entirely wanting. *Lumbricus* emits no yellow fluid; this species does, though not always. *Lumbricus* is a true earthworm, this is as truly dendrobænic. Surely these are characters which cannot be ignored, and show conclusively that the mere shape of the prostomium is an insufficient generic character unless accompanied by others which are permanent.

We are now in a position to consider the several British species of the subgenus *Dendrobæna* which have so far been observed and described.

Genus *Allolobophora*, § *Dendrobæna* = Group No. 3 of Rosa's Classification.

1. A. (*Dendrobæna*) *celtica*, Rosa.—Prostomium only partially dovetailed into the peristomium. Individual setæ somewhat widely

separated. Length 1 to $1\frac{1}{2}$ inches, of a dark brown or violaceous colour dorsally, tending to iridescence; lighter on the ventral side. Clitellum flesh-coloured, dirty yellow or grey, and depending considerably on the habitat, occupying 6 segments (31-36); *tubercula pubertatis* on 33-34. Male pore on segment 15, borne on papillæ which extend to segments 14 and 16. In adult specimens segments 9, 25, and 26, also have glandular tumidities or papillæ. First dorsal pore between 5 and 6. Copulatory setæ on segments 31, 32, 35. About 100 segments.

Synonym: *Allolobophora celtica*, Rosa, Boll. Mus. Zool. Torino, 1886; *A. mammalis*, Rosa, 1893, see Rev. dei Lumb. p. 39.

DISTRIBUTION IN IRELAND.—Loughlinstown, Co. Dublin (Dr. Scharff); Woodenbridge, Co. Wicklow (Dr. Scharff); Aghaderg, Co. Down (Rev. H. W. Lett); Holywood, Co. Down (Miss C. M. Patterson); Valencia, Co. Kerry, (Miss Delap); Carrablagh, Lough Swilly (Mr. Hart), etc.

I have received some very suggestive varieties from Counties Down and Dublin, one of which I have in some of my papers called var. *rosea*, Friend. I find that this variety is in reality the tree-haunter, while the type is a terrestrial form. Here we have room for fuller investigation, that it may be ascertained to what extent the habitat affects the species. It would be profitable also to endeavour to ascertain something more respecting the question whether these species have adopted the dendrobænic mode of life from the terrestrial, or *vice versa*.

[2. **A. (Dendrobæna) boeckii**, Eisen.—This worm has rarely been taken in Great Britain. I have, in fact, up till the present only three absolutely reliable records. The species is well-defined, but there has been in the past endless confusion owing to the supposed connection between it and *Lumbricus puter*, Hoffmeister. Eisen's description is very brief, and I, therefore, describe the species from my own material.

Prostomium more deeply imbedded in the peristomium than in the last species. Male pore on segment 15, on somewhat prominent papillæ. First dorsal pore large, between segments 5 and 6. Girdle of 5 segments normally, covering 29-33, with *tubercula pubertatis* on 31, 32, 33. Anal segment somewhat pear-shaped. Length about $1\frac{1}{2}$ inches (Rosa gives 25-35 millim. for specimens in spirits). Total number of segments 80-100. Colour reddish-brown, with red clitellum and light, flesh-coloured ventral surface. Setæ in 8 almost equidistant rows. Although Eisen and many others have regarded *Lumbricus puter*, Hoffm., as corresponding with this species, my examination of the subject negatives the idea,¹ and I have no hesitation in referring Hoffmeister's worm to Eisen's *Allolobophora subrubicunda*—a worm which is far more widely distributed than *D. boeckii*, and one which has been mistaken for the latter by many authors. I regard this species as being without synonyms, and take Eisen's description as the original account of a new species as well as a new genus. This worm is so much like *Lumbricus purpureus*, Eisen, that it might easily pass as a true *Lumbricus*. We may compare also *L. melibæus*, Rosa.

Found in similar haunts to those chosen by the last species, but not yet on record for Ireland, where it ought to occur in the upland districts.]

¹ I am glad to find myself supported in this view by so reliable an authority as Dr. Rosa, of Turin.

MAGNESIAN LIMESTONE IN THE NEIGHBOURHOOD OF CORK.

BY JAMES PORTER, B.E.

[At the Meeting of the Cork Naturalists' Field Club, before which Mr. Farrington read his paper on the above, Professor Hartog suggested that the criticisms of the writer should be embodied in the present communication.]

THOSE who are acquainted with the state of geological science will not consider it remarkable that the revolutionary views put forward by Mr. Farrington in the May number of the *Irish Naturalist* should be promptly challenged. If geological problems could be solved independently, without taking into account their mutual bearings, his theory might be accepted; but as things are, I believe we must continue to regard our Cork dolomite as simply altered Carboniferous limestone.

Of the seven propositions which Mr. Farrington lays down as inconsistent with the theory of Harkness, I cannot see the adverse bearing of more than one, which refers to the abruptness of the change from limestone to dolomite. But the Cork examples cannot be looked at by themselves in this way. There are numerous instances of transitions as abrupt as any to be found in Cork, in districts where the evidence of pseudomorphic origin in the case of the dolomite, is too complete to leave any room for doubt. Professor Cole informs me that such instances are frequent in Co. Dublin; and the expression "vertical dyke-like masses," used in the Geological Survey memoir to describe some portions of the pseudomorphic limestone near Mallow, would apply equally well to the aspect of those magnesian deposits whose origin is under discussion.

Most geologists will regard the fact stated by Mr. Farrington that "the dolomite is generally less pure than the limestone," as a pretty clear indication that the magnesian bands mark the course formerly taken by underground water, which carried with it the products of its action on the overlying rocks, including ferruginous and other impurities as well as magnesia itself. If, instead of the expression of Mr. Farrington, "nearly fifty per cent. more foreign matter," we use his figures of 2.5 for the dolomite and 1.7 for the limestone as the percentage of

foreign matter in each, they would suggest to our minds, not an utter want of connexion between the two as regards origin, but rather some such relation as that which I have just referred to.

The sketches given by Mr. Farrington in the May number do not exaggerate the steepness of the walls of our local magnesian deposits. He supposes that the spaces now occupied by these were either carved out by the action of rapid streams, or opened by terrestrial disturbances. As regards the first supposition, we are met with the difficulty that there is no instance known of a natural open water-channel which could form the counterpart of these hollows in point of steepness of sides; while their abrupt termination at both ends introduces a fatal objection to the cañon theory of their origin. On the other hand, the idea of earth-movements giving rise to widely-gaping fissures which remained open long enough to be filled by the necessarily slow process of chemical precipitation, will hardly appear a plausible one to any observer of actual rock-forms.

On Mr. Farrington's view of their origin, the magnesian deposits ought to show distinct traces of bedding other than that of the limestone around. It was perhaps his desire to account for the absence of anything of the kind, which led him to conclude, on what seems very slender evidence, that the dolomite had been always subjected to the action of heat. It would indeed be remarkable if the heat had rendered it crystalline without seriously affecting the limestone in immediate contact with it. But the mere fact of dolomite resembling saccharine marble does not tend to prove the action of heat at all. The structure of dolomite is usually distinctly crystalline; and the difference between it and limestone in this respect is occasionally relied upon as a rough means of discrimination. The presence of iron pyrites in the dolomite suggests rather the reducing action of percolating water charged with organic matter than the action of heat.

When we come to the history of our southern land-surface we reach the climax of difficulty. The Permian theory requires that denudation should have been so rapid during the early part of the Permian period as to strip off the Coal-measures and much of the Carboniferous limestone, leaving ample time for a series of crust-movements which extended over hundreds of

square miles and squeezed the rocks of Cork and Kerry into numerous folds. All this geological work would have had to be accomplished before the close of the Permian period, for time must of course be allowed for the newly-opened fissures to be filled with their magnesian contents. As regards the denudation, the most rapidly-working agencies with which we are acquainted could not possibly have done this ; and we have no particular reason to think that the monitors of the Californian gold-miners were anticipated and dwarfed by any corresponding machinery guided by armies of Labyrinthodonts. The view generally held by geologists regarding the history of the Irish land-surface, assigns almost the entire interval between the Carboniferous and the present time for this denudation. Mr. Farrington's theory, however, further requires that the fissured limestone surface which formed the bottom of the Permian lake, should have been preserved from complete removal during the long Secondary and Tertiary revolutions, with only a thin layer of "soft Permian strata" to protect it ; a layer which when the time came was cleared away without difficulty by the glacial action which has been known to spare many softer deposits. The acceptance of all this is really impossible.

The chemical part of the original theory of Harkness is certainly open to modification. It would seem that the alteration of the Carboniferous limestone into dolomite was effected, not by the magnesian salts in sea-water, but by magnesia held in solution by carbonic or humus acids in the water which penetrated downwards through the surface rocks. I am inclined to think that in some cases a line of fault-rock furnished a readier passage for the water percolating through the limestone than its joints afforded, as the soft fissile layer between the dolomite and the limestone which Mr. Farrington has described looks very like a slickenside at times ; but this is a point which is better left to those who can examine a great development of the rock. I am quite convinced that nothing is likely to be adduced regarding the Cork dolomites which can seriously affect the main conclusion of Harkness, that they are products of alteration.

REVIEW.

Guy's South of Ireland Pictorial Guide. Cork: Guy & Co., 1893.

We have received a copy of "Guy's South of Ireland Pictorial Guide," which will supply visitors with an excellent and profusely-illustrated guide to the southern counties, and to Cork city and Killarney in particular. The most novel feature of the hand-book, and the one to which we wish to draw attention, is the series of short articles on local vertebrate zoology, phanerogamic botany, and mineralogy, specially contributed by such well-known Irish naturalists as Messrs. A. G. More, F.L.S., R. J. Ussher, J.P., G. H. Kinahan, M.R.I.A., and R. A. Phillips. This is a department in which local guide-books are usually lamentably deficient, natural history being frequently altogether ignored, or if mentioned at all, being treated in a manner at once incompetent and inaccurate. In Messrs. Guy's production, however, the botany is from the pen of Mr. More, the recognised authority on the subject in Ireland, and his remarks take the form of a short and interesting essay on the peculiar and characteristic plants of the south and west of Ireland, and their origin and distribution. Mr. Ussher supplies excellent notes on the birds of the district, and Mr. More on the fresh-water fishes; Mr. Phillips contributes pleasantly-written articles on the orchids and ferns, and Mr. Kinahan discusses the mineralogy of the southern counties. Messrs. Guy are certainly to be congratulated on having produced the first Irish guide-book in which at least a portion of the natural history of the district treated of is given the prominence which it deserves, and is described with accuracy by competent naturalists.

OBITUARY.

ROBERT J. BURKITT.

On the 3rd July, passed away at Carne Prospect, Belmullet, at the advanced age of eighty-six, Dr. Robert J. Burkitt, whose life-long devotion to ornithology may be inferred from the many references to him in Thompson's work, as well as from the specimens of unexampled rarity he preserved, and contributed to our museums from time to time. Resident as a physician in Waterford, he there collected and preserved birds with his own hands from 1830 until he left it about ten years ago, all of which he obtained in the flesh from that part of Ireland, and since he went to Belmullet he added to the Irish list the only recorded example of the Barred Warbler. During that long period he appears to have had no neighbours who sympathized in his pursuits. His generosity of disposition, so well known in Waterford by his gratuitous attendance on the poor, led him to bestow his Great Auk and other rarities on Trinity College Museum, and it is gratifying to know that his services as a naturalist, and his valuable gifts to the Museum, though long unacknowledged, were recognized by the present Board of Trinity College, who, a few months since, did a graceful act towards Dr. Burkitt.

Among the proofs of his friendship I have received, I may instance the gifts of his South African Eagle Owl and Baillon's Crane, both shot near Waterford, and now in the Science and Art Museum; also his set of Thompson's works, rendered doubly precious by being interleaved with letters written to him by Yarrell and Thompson. In Dr. Burkitt we have lost an Irish ornithologist who was a contemporary and friend of those men. Of a singular sincerity and simplicity of character, he abhorred shams of every description, and could not endure to owe money. Looking back on his long life, those closely related to him can remember no variance with him. He was ever the same true-hearted man. His intellect remained as clear as his handwriting to the last, a notice of his on Wild Swans having appeared in the May number of *The Irish Naturalist*.

R. J. USSHER.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

A Seal, captured at Moy, Ballina, has been presented to the Gardens by George Shannon, Esq. Three Lion cubs, and three Puma cubs, have been born in the Gardens.

9,460 persons visited the Gardens in June.

ARMAGH NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

JUNE 6th.—Field excursion to Ballybrawley stone circle and Navan Fort. In spite of the great heat, the few members that assembled determined to carry out the programme. On arriving at Ballybrawley it was observed with regret that one of the large boulders forming the circle was being broken up. If this course be persevered in there will soon be no stone circle left. Proceeding from Ballybrawley to Navan Fort, the party took a line across the country. Arrived at Navan Fort, much speculation was indulged in as to the disposition of the ancient town, if such it can be called. On the way home specimens were met with, on the old road to Armagh, of *Geranium pratense*, and its handsome purple flowers were much admired. On the railway bridge at Ballybrawley, a quantity of the pretty little Wall-rue (*Asplenium ruta-muraria*) was observed. Various insects were captured, the most noteworthy being the Hemipteron, *Calocoris roseomaculatus* and the Orthopteron, *Labia minor*.

JUNE 24th.—Field excursion to the souterrain at Drummanmore. This interesting relic of the early habitations lies about one and a-half miles north-east from Armagh. It does not seem to be well known to the inhabitants, and, consequently, it was hoped that a number would be attracted to the excursion. However, but few assembled, but these reaped the reward of their efforts. MR. R. PILLOW gave an account of this interesting structure. The souterrain now opens towards the west, and there is a passage running from the side opposite the present entrance in a south-eastern direction. This passage, Mr. Pillow informed the party, was twenty-one feet in length, and opened into another chamber which is now blocked up. The floor is covered with mud and earth, but appears to have been considerably lower than at present. Mr. Pillow gave the actual height as about seven feet, breadth about ten feet. It is hoped that the Society will undertake the clearing out of the chamber and passage, and no doubt leave could be obtained to excavate the second chamber. Mr. Pillow read a passage from the "Tripartite Life of St. Patrick," from which it appeared that a religious cell was established east of Armagh by Crumtheris, one of a party of virgins who came to visit St. Patrick. It was conjectured that this souterrain might have had some connection with this lady's settlement. It is much to be regretted that more of the members did not attend these excursions, and it seems strange that none of the officers of the society were present on either occasion, with the exception of the President.

BELFAST NATURALISTS' FIELD CLUB.

JUNE 24th.—Half-day excursion to Blackhead, which was attended by a party of over sixty. The basaltic rocks of the promontory claimed attention, and a short lecture on the geology of the neighbourhood was delivered by the President (MR. WM. SWANSTON, F.G.S.). A compliment was paid to Mr. B. D. Wise, C.E., Engineer of the Northern Counties railway, for the skill and good taste which he has displayed in the construction of a path along the hitherto inaccessible base of the cliffs.

BELFAST AND DUBLIN NATURALISTS' FIELD CLUBS.

JULY 4th, 5th, and 6th.—The joint three-day excursion of the two Clubs to Dundalk, Newry, and Carlingford, proved an unqualified success, and we are glad to learn that a determination was expressed by members on both sides that such meetings should be made periodic, and that the southern Field Clubs also should be given an opportunity of meeting their fellow-societies. On the first day, the combined party, numbering five-and-twenty, assembled at Dundalk, and drove first to Ballymascanlan, where one of the finest cromlechs in Ireland was inspected, and also a kistvaen. Proceeding northward, a halt was called at the interesting carved pillar-stone of Kilnasoggarth, which received due attention. The next item on the programme was the ascent of Slieve Gullion (1,893 feet), which was accomplished by a large section of the party, the others proceeding in wagonettes to the ancient and interesting church of Killeavy, where they were subsequently joined by the mountaineers. On Slieve Gullion some good plants were obtained, and some interesting insects. On the way to Newry a halt was called at the Bessbrook granite quarries, where Mr. Flynn, the proprietor, had a number of blasts ready, which were fired, and several hundred tons of rock brought down. Dinner was served at the Victoria Hotel, Newry, at 9.30, and, subsequently, a presentation, consisting of a beautiful morocco album filled with photographs taken on the B.N.F.C. excursions, was made to Mr. R. Lloyd Praeger, by the members of the Belfast Club.

On the second day an early start was made, and the party drove to Carlingford mountain, picking up some good plants on the route. While the greater portion of the members ascended the mountain, a few proceeded by road to Carlingford town. Several hours were spent on the mountain, and a large amount of collecting was done; the fungi and flowering plants proved to be the groups which yielded the best results. On the highest point of the mountain, Prof. Cole, F.G.S., briefly drew attention to the geological formation of the surrounding country, which lay spread out like a map on every hand. Lunch was partaken of at Carlingford, among the picturesque ruins of King John's Castle, and the party proceeded by rail to Greenore, where a couple of hours' examination yielded good results to zoologists, botanists, and geologists alike. After dinner at Newry, an evening meeting was held, under the chairmanship of Dr. McWeeney, President D.N.F.C., when the following communications were brought forward:—"Mosses and Hepatics of the district," D. McArdle; "Flowering Plants of the district," R. Lloyd Praeger, M.R.I.A.; "Local Geology," illustrated by limelight views, Prof. Cole (in the regretted absence of Prof. Sollas, F.R.S., who had met with an accident on Lambay island); "Antiquities of the district," F. J. Bigger, Hon. Sec., B.N.F.C.; "Vertebrates of the district," H. Lyster Jameson; "Fungi collected on the excursion," Dr. McWeeney.

On the third day members turned out at seven a.m., and paid an early visit to the nursery garden of Mr. Thomas Smith, well known for its botanical rarities. After breakfast, the party drove by the picturesque upper road to the woods of Ferry-hill, where a profitable hour was spent. Crossing Narrow-water ferry, Major Hall's beautiful grounds were entered, and the artificial and natural beauties of the place were much appreciated. Returning to Newry, early dinner occupied attention, after which the business meetings of the respective Clubs were held, and a number of new members elected, and after mutual congratulations on the success of the trip, and a most kind invitation from the Dublin members to their Belfast brethren to spend three days with them in Dublin at the end of the month, the party adjourned to "The Glen," where they were most hospitably entertained by Mr. Barcroft. Subsequently members proceeded to the railway station, taking their respective trains to Belfast and Dublin.

Among the more interesting species taken on the excursion are the following:—Flowering plants:—*Carduus crispus* and *Lychnis vespertina*, near

Dundalk; *Torilis nodosa*, at Dromantee; *Vaccinium vitis-idea*, *Melampyrum pratense* var. *montanum*, and *Pinguicula lusitanica*, on Slieve Gullion; *Circea alpina* and *Trifolium medium*, base of Carlingford mountain; *Polypodium phegopteris*, *Hymenophyllum wilsoni*, and *Sedum rhodiola*, near summit of Carlingford mountain; *Chenopodium bonus-henricus* and *Malva rotundifolia*, Carlingford town; *Eryngium maritimum*, *Glaucium flavum*, *Torilis nodosa*, *Polygonum raii*, *Atriplex arenaria*, *Silene anglica*, *Sinapis alba*, *Cynoglossum officinale*, *Linaria minor*, *Euphorbia exigua*, *Papaver argemone* and *Carduus crispus*, at Greenore; *Lastrea amula*, *L. oreopteris*, and *Hymenophyllum tunbridgense*, on Ferry-hill; *Statice bahusiensis*, and *Obione portulacoides*, Narrow-water ferry; and *Thrinicia hirta*, on lawn at Narrow-water castle. The mosses, hepatics, and fungi are in the hands of Dr. McWeeney and Mr. M'Ardle, who will report on them later, when the material collected is worked out. In the department of zoology, the beetles taken include:—*Notiophilus biguttatus*, *Elaphrus cupreus*, *Phadon tumidulus*, *Erirrhinus acridulus*, Dundalk; *Silpha subrotundata*, *Lochnæa suturalis*, Fathom mountain; *Cafius xantholoma*, *Gastroidea polygoni*, *Hypera polygoni*, at Greenore; *Serica brunnea*, *Otiorrhynchus maurus*, Carlingford; *Barynotus schonhetri*, Slieve Gullion: while among the rarer Hemiptera are:—*Gerris costæ*, in small pool near top of Slieve Gullion; *Salda orthochila*, Slieve Gullion; *Pithanus maerkeli*, Dundalk; *Calocoris roseomaculatus*, Carlingford; *Lygus lucorum*, Dundalk and Fathom; *Notonecta glauca*, in lake at 1,800 feet on Slieve Gullion. Lepidoptera were very few in number, and of no special interest.

NOTES.

BOTANY.

FUNGI.

Fungi from the South-West.—On the Royal Irish Academy excursion to the neighbourhood of Castletown Bere, Co. Cork, I collected the following as well as other species:—*Tremella indurata*, Sommerf., Dunboy Castle; *Coniophora*, sp. indet., *ibid.*; *Marasmius*, sp. indet., *ibid.*; *Ceratium hydroides*, A. and S., abundant in Dunboy wood; *Dactylium roseum*, Bk.; *Stackybotrys atra*, Ca., growing in conjunction with *Chectomium chartarum*, Ehrb.; *Puccinia saxifragæ*, Schlecht, on *S. umbrosa*, Hungry Hill; *Melampsora helioscopiæ*, Pers., on *Euphorbia hiberna*, everywhere; *Sphærotheca castagnei*, Lev., abundantly on *Euphorbia hiberna*. (As the conceptacles were not perfectly ripe, some doubt remains as to the identity of the species.) *Nibrissea margarita*, White, on dead heather stems in boggy places, at altitudes above 1,000 feet on Hungry-hill, Co. Cork; *Lachnea scutellata*, Linn., Dunboy; *Arceyrea incarnata*, P., *ibid.* In conclusion, it should be stated that two circumstances were especially unfavourable to the collection of large numbers of fungi—the dryness of the weather, and the rapidity with which it was necessary to proceed. I have no doubt that had I been able to devote several days to Dunboy wood, I should have been able to record a much greater number of interesting species.—ED. J. McWEENEY, Dublin.

Fungi from Altadore, Co. Wicklow.—Towards the end of June I paid a visit to this beautiful little glen along with Dr. Scharff and Mr. Praeger, and found the following species:—*A. (Pluteus) cervinus*, Scharff; *A. (Mycena) epipterygius*, Scop.; *Calocera cornea*, Fr.; *Hydnum alutaceum*, Fr.; *Mollesia discolor*, Mont.; *Lachnella schumacheri*, Fr., var.

plumbea, Grev. ; *Lachnella cerina*, Pers. ; *Calloria xanthostigma*, Fr. ; *Calloria vinosa*, A. and S. ; *Vibrissea guernisaci*, Cronan ; *Ceratium hydroides*, A. and S. ; a very curious sp., probably an *Achlya*, on dead flies lying on dripping *Fontinalis antipyretica* that had been exposed by the shrinkage of the stream. *Trichia fallax*, Pers. ; *Arcyrea punicea*, Pers. For the identification of some of the Discomycetes I am indebted to the kindness of Mr. W. Phillips, of Shrewsbury.—ED. J. M'WEENEY, Dublin.

PHANEROGAMS.

Spiranthes romanzoviana in Co. Londonderry.—On July 15th, while collecting plants on the Derry banks of the Bann, near Kilrea, I was struck by the appearance of an orchid, which seemed to be one of the *Habenariae*. A second glance, however, showed me that it was something with which I was unfamiliar, and I gathered the plants which I saw, six in flower, but only taking one root. I put them into my vasculum, and continued my walk down the river, meeting with several other plants new to me. After getting back in the evening, I compared my specimens with the descriptions given in Hooker and Benthams, and came to the conclusion that I had been so fortunate as to find one of the very rare *Spiranthes*, probably *S. romanzoviana*. I had read Mr. Praeger's description of it in the September number of *Journal of Botany* for 1892, but had not it at hand to help me. The flowers were most fragrant. I forwarded specimens to Mr. S. A. Stewart and Mr. Lloyd Praeger, and to my great delight they have confirmed my conjecture. The land in the vicinity of the place where I found the plant consists of worn-out and long-disused bog, as is proved by the portions of bog-oak projecting into the river. It apparently has been little cultivated, but kept for pasture or meadow. While writing I may add to this note that I refound *Stachys betonica* growing plentifully in the station given by Dr. Moore, not very far from the bridge at Kilrea. The field in which it grows has been long used for pasture, and the plants, owing, I presume, to their having been often cropped by cattle, are smaller and more stunted than those I gathered in Co. Donegal some years ago.—MRS. LEEBODY, Londonderry.

Helianthemum vulgare in Ireland.—In the *Journal of Botany* for July, Mr. H. Chicester Hart records his finding of *Helianthemum vulgare* on the limestone between Donegal and Ballyshannon. This very pretty plant, though abundant in many parts of England and Scotland, has not been previously found in Ireland. While congratulating Mr. Hart on his discovery, might we suggest to him the desirability of placing a specimen in the herbarium of our National Museum, where the Irish flora is receiving careful attention at the hands of Prof. Johnson.

Malva moschata.—Rev. H. W. Lett writes us from Loughbrickland, Co. Down :—"I enclose a specimen of *Malva moschata* from the seven-acre meadow lying between the glebe house and the lough. The field has been under my notice for the last seven and a-half years, and I never observed the plant until this summer, when it was very conspicuous among the short grass. The field where it grows has not been broken up within the last ten years, and there are no plants of this *Malva* in my garden, or anywhere else that I know of in the neighbourhood, nor have I had seed or plant of the same for seven and a-half years. At Ardmore [Co. Armagh] I found *M. moschata* in old pastures similar to the one here." This appears to be an interesting case of colonization: can any of our readers quote similar instances?

Flora of Co. Armagh.—To my enumeration of the flora, I may add the names of three additional species, all of which, however, must rank as casuals or escapes. *Silene armeria* I found on the G. N. railway at Wellington cutting, along with *Diplotaxis muralis* and *Carum carui* ;

Melilotus officinalis, Willd., on the railway at Bessbrook; while *Ceranium pratense* grows in some abundance by the old road from Armagh to Killylea, where it was observed last year by myself, and the present year by Rev. W. F. Johnson; it is no doubt an escape from a cottage-garden. The recent Field Club trip to Slieve Gullion added another station for *Melampyrum pratense*, var. *montanum*; several members obtained good specimens on the southern side of the mountain at 1,000–1,500 feet.—R. LLOYD PRAEGER.

Azolla carolineana in fruit.—It may be interesting to some to note that this curious little aquatic—albeit not a native of Ireland—is now producing its fruit abundantly in a shallow pond in Mount Usher garden, Co. Wicklow. I understand it has rarely been known to fruit in the open air in Great Britain or Ireland, although it does so on the Continent of Europe.—GREENWOOD PIM.

Colour-variation in Wild Flowers.—In reference to Mr. Praeger's remarks on this subject in the *I. N.* for June, I may add a species to his list—*Silene acaulis*, of which I found patches with pure white flowers among others of the normal colour on Binevenagh, Co. Derry, a few years ago.—MRS. LEEBODY, Londonderry.

Obione portulacoides, L. at Dundalk.—I mentioned in "Flora of Armagh" on p. 157, the occurrence of this local plant at Dundalk, but it may be well to make a separate note of it, as it is rare in Ireland, and apparently not on record from this locality. It grows in great abundance over the immense stretch of salt-marsh that fringes the sea south of Dundalk harbour, along with *Statice bahusiensis*. I first observed it there in January, 1889.—R. LLOYD PRAEGER.

ZOOLOGY.

INSECTS.

Sirex gigas and Macroglossa stellatarum in Co. Louth.—On July 9th I received from Rev. R. M. P. Freeman a female *Sirex*, taken at his rectory (Collon, Co. Louth.) In the same consignment was a specimen of *Macroglossa stellatarum* also taken at Collon, where it attracted Mr. Freeman's attention by its humming, while it hovered over some flowers outside his house. *Sirex gigas* is apparently not unknown to the country people at Cotton, who, according to Mr. Freeman, accuse it of stinging their cattle!—H. LYSTER JAMESON, Killencoole, Co. Louth.

Coleoptera in Co. Dublin.—The following Coleoptera, taken by me, and identified through the kind assistance of the Rev. W. F. Johnson, have apparently not been previously recorded from Ireland. *Anisotoma parvula*, Sahl., one specimen, Santry, by sweeping; *Malthodes mysticus*, Kies., occurred near Santry (in company with *M. marginatus*, Latr.); *Dasytes aerosus*, Kies., Santry, one specimen, sweeping; *Cis alni*, Gyll., found one specimen last January in a fungus on an elm in Phoenix Park (with great numbers of *C. nitidus*, Herbst.); *Anaspis garneysi*, Fowler, rare, sweeping nettles, Royal Canal bank; *Apion ulicis*, Forst., Friarstown Glen, near Tallaght, by beating furze; *Hypera meles*, F., I was fortunate enough to capture this rare species among the long grass on the railway bank near Sutton, by sweeping; *Magdalis carbonaria*, L., one specimen off birch, Santry; *Hylesinus fraxini*, Panz., Lucan demesne. With the exception of *Cis alni*, Gyll., all the above were taken during the months of April and May.—J. N. HALBERT, Dublin.

MOLLUSCA.

Donegal Mollusca.—The July number of the *Journal of Conchology* (vol. vii., No. 7, 1893,) contains an interesting article by Mr. R. Standen on the land and fresh-water Mollusca collected by him around Portsalon, Co. Donegal. The rejectamenta on the golf-links proved to be very productive. Large quantities of shells had accumulated in a sheltered hollow, and with painstaking industry Mr. Standen picked out a number of rarities. Although these were dead shells, he found them in remarkably good condition, and as fresh-looking as living specimens. The following deserve special mention :—*Hyalinia draparnaldi* :—this had never previously been taken in the north of Ireland; Portsalon is probably the most northern station of the species in Europe. *Helix arbustorum* :—one dead shell was found; although it does not place the occurrence of this species at Portsalon beyond a doubt, it is extremely probable that it will be found living in the neighbourhood. *Helix hortensis* is mentioned as being more plentiful at Portsalon than *Helix nemoralis*. *Vertigo alpestris* :—this arctic species, of which only a single specimen had hitherto been found in Ireland, is no doubt the most important discovery Mr. Standen made. Sixty-four species in all are recorded. A number of these are new records for the Co. of Donegal, but some of them had been previously found by Mr. Milne without having been recorded.

FISHES.

Ray's Bream (*Brama rail*) in Co. Waterford.—A specimen of this rare fish, caught about 3rd June last at Dungannon, was seen by me at Street's establishment, in the city of Waterford, on 6th June. I at once made a water-colour sketch of the fish, and forwarded it through a friend to Dr. Scharff, of the Science and Art Museum, Dublin. He identified the specimen from the sketch, as did also Mr. A. G. More, to whom it was shown. Unfortunately the eyes of this specimen were missing when it arrived in Waterford.—C. P. CRANE, Waterford.

BIRDS.

Quails (*Coturnix communis*) in Co. Wicklow.—On 10th June, while walking through a meadow in the vicinity of Enniskerry, I flushed a Quail, and some hours later on the same evening, I heard its well-known note in the same place. On the 2nd July I visited the spot again, and found the meadow had been cut, and the Quail had located itself in the adjoining corn-field. A friend of mine, in Greystones, informed me that he heard the Quail frequently in June last among some corn outside Delgany.—E. C. BARRINGTON, Dublin.

MAMMALS.

The Reddish-grey Bat (*Vespertilio nattereri*) in Co. Louth.—A male of this species flew into a house in Dundalk, on June 16th, and was captured by Mr. T. Kerr, who brought it to me alive. I am indebted to Dr. R. F. Scharff for the identification of my specimen.—H. LYSTER JAMESON, Killenchoole, Co. Louth.

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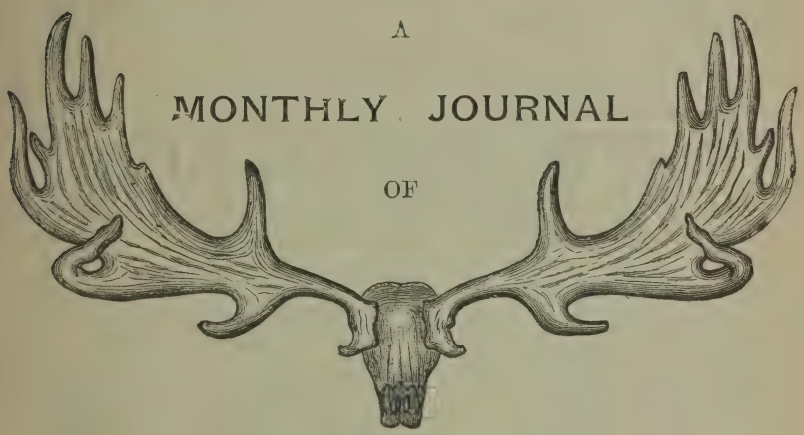
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VOL. II.

SEPTEMBER, 1893.

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THE BIRDS OF THE MIDLAND LAKES AND BOGS, CHIEFLY AS OBSERVED IN THE BREEDING-SEASON.

BY R. J. USSHER.

BEFORE I had visited those parts of Ireland herein referred to, when I looked at the map of counties seamed with lakes and their ramifications, I imagined vast swamps must exist, where the waters lost themselves among extensive reed-beds. In reality, however, Ireland being an undulating, not a flat country, vast swampy solitudes are hardly to be found anywhere in summer. The shores of Irish lakes usually rise rapidly into dry inhabited ground, often swelling into heights, so that, except in certain bays, and at the tail-ends of lakes, large reed-beds seldom occur. The humid boggy soil, however, even on sloping ground yields abundance of rushes, Iris, Meadow-sweet, and other rank vegetation which affords to ducks, Redshanks, Lapwings, and Snipe, cover to nest in, and the numerous islands often contain scrub or natural wood. The open islands are, unfortunately for the feathered race, invaded habitually in the breeding season by persons fishing on the lakes, who, in pursuit of green-drake flies for bait, trample the whole surface. Elsewhere turkeys are fed on eggs of gulls and terns, until the latter are driven from their breeding-grounds. In certain shooting-preserves, however, as the marshes of the Erken on Lord Castletown's property in Queen's Co., at Barronston on Lough Iron in Westmeath, on Killeenmore bog near Geashill, the property of Lord Digby, and Lough Key in Roscommon, which adjoins the demesne of Rockingham, great assemblages of birds of many species, breeding in peace, attest the benefits of protection.

The "red bogs" are tracts of country overlaid by level beds of peat, often covering thousands of acres, which from their barren nature, and the dangers of their swampy portions, are seldom invaded by men or cattle. Here the Curlews lay among the heather, and Black-headed Gulls breed in the wetter and more lonely parts. Such bogs skirt much of the Shannon, as between Athlone and Banagher, the flats along the river being the only green surface visible. These flats, called "callows," overflowed in winter, yield in summer a rank crop, chiefly of Meadow-sweet, which is annually meadowed, but before it is cut, affords unlimited breeding-grounds to the numerous Redshanks that frequent it.

Some of the larger lakes, especially Lower Lough Erne, are exceedingly beautiful, where adjoining proprietors have preserved along the shores remnants of the natural woods, which clothe the islands with a growth of Oak, Rowan, Ash, Birch, and willows. Here every island is tenanted by its pair of Mergansers, which display their chequered plumage as they dart past, while light terns flit over on their dainty wings, and Tufted Ducks breed in the flags among colonies of gulls, or among the dense rushes on the slopes of the islands.

Taking the valley of the Shannon, with its chain of lakes, I include the adjoining counties of Connaught, or the eastern portions of them, and the lakes and bogs of Sligo, Leitrim, Fermanagh, Cavan, Longford, Westmeath, King's and Queen's Counties, and Tipperary, but I do not refer to Lough Neagh, to the western lakes of Conn, Mask, and Corrib, nor to the lower Shannon, west of Lough Derg.

I have made excursions in the end of May and beginning of June for the past three seasons through the above lake-districts. Where I give a list of localities, I refer chiefly to my own observation of the bird at these times, prefixing an asterisk where I obtained proof of its having eggs or young.

My selection of species depends on my having something special to say about them in connection with the above parts of Ireland. I do not enumerate birds which, though found about the lakes, are not characteristic of them, being found commonly in counties of a different character; as the Heron, Moor-hen, Water-rail, and Snipe, but I have given special attention to certain waders, grebes and gulls, as these chiefly breed in the region of the lakes. The Ducks, except the

marine species, are given at greater length, as being frequenters of the lakes, whether in summer or winter, and among them we may chiefly add to our list of the breeding birds of this region. The Geese and Swans also deserve a mention.

I am largely indebted to the help and hospitality of those gentlemen who have promoted my researches, and contributed their own information.

The MERLIN, not confined to the mountains, is resident in small numbers on the great red bogs of the central plain. Its eggs have been obtained in Westmeath, King's Co., and Queen's Co. in such situations, and it is reported to breed in eastern Galway.

The MARSH HARRIER, previous to about 1840, was a common resident on Lough Erne. Its nests were found on waste ground about the lake. Since then it has been practically exterminated by game-keepers, and so reduced in its haunts in Westmeath and King's Co., as to be quite a rare, or at least, a scarce bird there now. The only occasion in which I met with it was on the 14th April, 1893, when I visited the extensive marshes of Lord Castletown, near Granston Manor, in Queen's Co. These cover more than eight hundred statute acres, and are a paradise for ducks, Lapwings, Redshanks, Coots, and Gulls. High over these marshes I saw sweeping in curves, three Marsh Harriers, two together, and a third apart. After two or three flaps, they would sail round, holding the wings slanting upwards. In wind, however, they are seen flying low, almost beating the tops of the flags with their wings in quest of their prey. As they are seen there at all seasons, they must breed. On the extensive red bogs in the east of King's Co., Mr. Digby used to see Marsh Harriers at all seasons until 1889, and has heard of the nest being found, and some have since been seen by keepers. Lough Iron, in Westmeath, was a favourite resort, where many have been shot, from time to time. A pair usually appear there about August, but they do not remain. Co. Galway was another stronghold of the Marsh Harrier. It has been reported to me, apparently as a straggler, from Derrycarne, Co. Leitrim, on the Shannon; from bogs near Lough Annagh, King's and Queen's Counties; from Co. Tipperary; and from the Shannon near Banagher, where my informant has ob-

served it hover over a Coot, which dived until it could dive no longer, and was then taken for a prey.

The SEDGE WARBLER struck me not by its presence in the lake-districts so much as by its scarcity. It is reported to me as breeding in every Irish county, except Longford, where I have met with it, and in Cavan, Clare, and Leitrim, where my informants have probably overlooked it. I have observed it near Castle Irvine, Fermanagh; on Lough Oughter, Cavan; Lough Iron, Lough Owel, and Lough Drin, in Westmeath; and on the Shannon near Banagher. Still these instances are few, and I was greatly surprised when I listened for it in vain about Lough Derg, Lough Ree, and a host of other lakes and marshy spots. It is stated to be local and uncommon in Westmeath and King's Co.

The GARDEN WARBLER, though not confined to the lake-districts, has only been observed by me there, and as yet my knowledge of it points to the valleys of the Shannon, to Lough Erne and Lough Arrow, as some of its chief resorts in Ireland, but I have reason to think that it is to be found in Queen's Co., and probably in many other districts. I have recently treated of it at greater length (see *Irish Naturalist*, July, 1893).

The WILLOW WARBLER is very abundant about the lakes and among the willows, even on the lonely parts of the Shannon.

The REED BUNTING is the most characteristic passerine bird of the lakes. It is to be found where no other small bird is to be seen. On every islet one may find nests of this species among the coarse sedgy grass. It is usually hatching, but sometimes rearing young, the first week in June. It is reported to breed in every Irish county, except Carlow, where it must have been overlooked.

The SPOTTED CRAKE, though uncommon, probably breeds in many instances. Its eggs, taken by Col. Irwin, in Roscommon, about 1856, are now in the Science and Art Museum. Two were shot, and two others seen on Upper Lough Erne in late summer or early autumn, 1890, by Mr. George Husbunds, of Enniskillen; one was shot at Colebrooke, also in Fermanagh, on 27th September, 1890; two were shot in August, 1880, in Queen's Co., by Mr. T. Trench; and two were shot in Westmeath, in October, 1892 (*Irish Sportsman*, 29th October, 1892).

The Coor has its great strongholds in the lakes. Though

breeding all over Ireland, in some counties locally, it is exceedingly numerous where the shallower parts of lakes and the Shannon are margined with large beds of flags and tall rushes. Among these one finds its nests everywhere. On the larger lakes Coots do not seem to lay until the end of May or beginning of June, as their clutches are then usually incomplete. Where a rise had taken place in the waters of Lough Ree, I found a nest containing a flooded egg built upon, and another laid over it.

The RINGED PLOVER breeds in small numbers on most of the lakes. I have observed it in the breeding season, or found its eggs on *Lough Arrow, Lough Boderg (an expansion of the Shannon in Leitrim), Lough Forbes (another expansion in Longford), *Lough Sheelin, Lough Gowna, *Currygrane Lake, Lough Ree, *Glen Lough, Lough Iron, *Lough Derg, and Lough Annagh; and it is reported to breed in the Queen's Co. by Mrs. Croasdaile. In these localities the Ringed Plover lays in the end of May or beginning of June, and will sit on three eggs, as I have found more than once. On the 9th June I found young in down on the stony shore of Currygrane Lake. The nests are hollows in the gravelly or pebbly shores. On an island in Lough Sheelin I found a Ringed Plover's nest, with eggs, at the foot of a willow bush, and overshadowed by it; but it was a characteristic hollow in the gravel without lining, a nest of Common Sandpiper close by being comfortably lined. The Ringed Plover is a spring and summer visitant to the lakes, arriving on Lough Derg in February or March.

The LAPWING is a very common breeding bird throughout the region we are treating of. Though reported to breed in every Irish county, and numerous in most of them, one sees a great increase when passing into these lake counties. I have observed Lapwings in May and June on Lough Erne, Castle Irwin dam, Lough Arrow, Lough Allen, Lough Boderg, Lough Forbes, Lough Gowna, Currygrane Lake, Lough Ree, Glen Lough, Lough Iron, the Shannon "callows" near Banagher, Lough Derg, Lough Annagh, and Granston marshes. On the latter vast numbers of Lapwings were laying in the middle of April. They usually have young able to fly the first week in June. These, when squatting on the grass, lie with flattened back and wings, their brown plumage making them look like

cow-dung. I have more than once seen a Lapwing fly screaming at a Heron, which was evidently in dangerous proximity to its young, no doubt an acceptable meal to a Heron.

The DUNLIN is a bird that I have met with in breeding plumage, in which it is recognisable by its black breast-spot, on Lough Arrow, Lough Sheelin, Lough Gowna, Lough Ree, *Glen Lough, *Lough Iron, the Shannon near Banagher and again near Athlone, Lough Derg, and Lough Annagh. Mrs. Croasdaile has seen one on 11th May, on a lough near Rhynn, Queen's Co. I found the nest with eggs, incubation just commenced, on the 14th June, 1891. It was among coarse grass, where the Inny flows into Lough Iron. I identified the bird fully. Mrs. Battersby has in her collection a series of Dunlin's eggs, taken on the shores of Glen Lough, on the borders of Westmeath and Longford. She says the bird is a spring visitor there. On Lough Annagh, King's Co., I saw a party of fourteen in breeding plumage, on 30th April, 1892. On 1st June, 1893, I saw a party of four on an island in Lough Ree, which let me approach within ten yards. These could hardly have been breeding, but those that I saw on the "callows" of the Shannon, on Lough Gowna and Lough Sheelin, and elsewhere, were feeding busily, and I took them to be males foraging for hatching females, the localities being suitable, as well as the season—the end of May and beginning of June. The Dunlin does not seem to have been previously recorded as breeding in the midland counties.

The COMMON SANDPIPER is reported to breed in every Irish county, except Kilkenny, Wexford, and Waterford. I have observed it commonly on the various lakes I visited, as well as on the Shannon. There is no more noticeable bird on the lake-shores, which are enlivened by its musical, sustained cry as it skims over the water. On Lough Derg, Sandpipers' nests contained hard-set eggs by the end of May. On Lough Sheelin they were not so far advanced by the 11th June. In Hollybrook demesne is a promontory running into Lough Arrow, covered with tall Beech, beneath which I saw a Sandpiper hatching, while another had been known to nest on a high mossy bank, beside a shrubby walk, beneath a large Beech.

The REDSHANK breeds commonly throughout the parts of Ireland we have noticed. Along the "callows" of the Shannon these birds are exceedingly numerous, and some were

apparently still laying on the 4th June, though this must be exceptionally late, as I saw a young Redshank, of about ten days old, on Lough Gowna on 11th June. During my visit to Lord Castletown's marshes, in Queen's Co., on the 14th April, Redshanks, which were exceedingly numerous, were laying, or beginning to hatch. We saw there as many as nine or ten on the wing at a time, and their chorus of piping was in our ears all day. They were similarly numerous along the preserved shores of Lough Iron at Barronston. These birds, when excited by the invasion of their breeding-ground, perform a singular antic, rising in the air with violent cries and vibrating wings, and then slanting downwards, with rigid depressed wings, they reach the ground like a parachute. I have observed them in May or June on Lough Erne, Lough Arrow, Lough Key, Lough Oughter, Lough Sheelin, *Lough Gowna, Currygrane Lake, Lough Ree, *Glen Lough, Lough Iron, the Shannon, *Lough Derg, Lough Annagh, and at *Granston. They are reported to breed in Fermanagh, Roscommon, Leitrim, Cavan, Longford, Westmeath, Meath, Queen's Co., King's Co., and Tipperary, being, for the most part, summer visitants to the lakes; though Mr. Parker has observed them on Lough Derg in winter.

The CURLEW breeds extensively on the great red bogs, on which I have observed it near *Clonbrock, in Galway, and in Galway and Roscommon along the Shannon, Longford, *Westmeath, and King's Co. It is also reported to breed in Monaghan, Fermanagh, Cavan, Longford, Meath, King's Co., Queen's Co., and Tipperary. Between Banagher and Athlone, as I sailed up the Shannon on 4th June, it was the most noticeable bird feeding on the banks, and flying to and from the red bogs on the western side, where, as I was informed, young Curlews had been found on the 20th May. On Crit Bog, near Clonbrock, Co. Galway, on 30th May, Curlews, which evidently had young, came flying up one by one as we advanced, uttering a quavering whistle, quite different from their call-note, and skimming on before, alighted in full view to lure us away. I found a Curlew's nest among the taller heather, with remains of egg-shells. At Athlone I was informed that Curlew's eggs were often found on the bogs in May. Unlike the above waders, the Curlew, so far from forsaking its breeding-haunts in winter, is at that season seen on the bogs in flocks.

The WHIMBREL was only once met with by me on the Shannon, near Banagher, on 3rd June, 1892, but my visits to the lakes were too late for it. In King's Co., Mr. Digby states that it is "fairly common in early summer," and Mr. F. Dunne, that it is "common in May." In Queen's Co., Mrs. Croasdaile says that it is a "spring migrant," and Lord Castletown, that it is a "spring visitor in May," while on Lough Derg, Mr. Parker records it in a similar way. Thus it appears that the Whimbrel visits the central counties as well as the sea-shores.

BITTERNS. I am informed by Lord Clonbrock, that when he was a youth, about 1820 to 1830, he used every season, when grouse-shooting on his property, to meet with Bitterns, usually in pairs, which used to annoy him by running before the dogs a long distance before getting up.

(TO BE CONCLUDED.)

THE EARTHWORMS OF IRELAND.

BY REV. HILDERIC FRIEND, F.I.S.

(Continued from page 220.)

3. **A. (*Dendrobæna*) subrubicunda**, Eisen.—A well-defined species, and more widely distributed than any of the other dendrobænic forms. It often occurs by scores and hundreds in the midst of vegetable debris on the banks of rivers and streams, and is easily recognized. It is the largest, and in point of size, the most variable species of the group, and is more frequently found away from trees than the others.

Eisen described it in 1873 as a new species, but I am convinced that this is the *Lumbricus puter* of Hoffmeister, and must be identical with many of the worms which are now reckoned as synonymous with this. Eisen's description is clear and full, so far as external characters are concerned, and a slightly modified translation, to meet our methods of notation, will exactly suit our indigenous species.

Body cylindrical, somewhat depressed anteriorly and attenuated posteriorly, flattened on the under surface. Prostomium large and pallid, dividing the peristomium to about one-half its diameter. Girdle large and conspicuous, of a dull grey colour, and usually covering six or seven segments, 25, 26-31. On each side of the girdle ventrally, and covering segments 28, 29, 30, is a band which constitutes the *tubercula pubertatis*. Setæ in distant couples, not close together as in *Lumbricus*, or slightly separated as in the Brandling. Total number of segments about 90 or 100, length averaging 90 millimetres.

I may add that the colour is rosy red, with somewhat lighter under-surface. Setæ on pale glands, which arrangement makes them conspicuous. Spermathecae opening in the line of the dorsal setæ (Rosa).

A tender delicate worm, well adapted for bait. It is largely employed

by anglers in England, under the name of the Cockspur or Gilt-tail, the latter name being derived from the colour of the anal extremity. When a drop of methylated spirit is placed upon the living worm it exudes a yellow fluid, and this may be readily observed flowing from the dorsal pores, the first of which occurs, as Ude has correctly pointed out, between segments 5 and 6. Spermathecæ are found in the 10th segment, which open in intersegment 9/10 in the direction of the superior pair of setæ.

Eisen gives full directions for distinguishing between this species and the Branding (*Allolobophora fetida*, Sav.); but if examined in a living condition, these instructions are absolutely unnecessary. Dr. Greene informs me the Gilt-tail is called the Small Brambling [=Brandling] at Ferns. Benham is in error¹ when he says *A. subrubicunda* is destitute of spermathecæ and *tubercula pubertatis*.

Synonyms: *Allolobophora subrubicunda*, Eisen (*op. cit.*, p. 51). *A. putris*, Rosa, 1893. *Lumbricus puter*, Hoffmeister, 1845; *Dendrobæna puter*, Œrley, "A Mag. Olig. Faunája," 1880, p. 586. Œrley has rightly identified the worm, but did not recognize that it was the same as Eisen's *subrubicunda*. He, however, doubted the accuracy of assigning *L. puter*, Hoffm., to *D. boeckii*, Eisen. To this species, and not to *D. boeckii*, Eisen, as Rosa suggests, we must, I think, relegate the *Enterion octaedrum*, Savigny, and perhaps also *A. fraissiei*, Œrley.

DISTRIBUTION IN IRELAND.—Loughlinstown, Co. Dublin (Dr. Scharff); Leeson-park (do.); Blackrock, Co. Dublin (Miss Kelsall); Woodenbridge, Co. Wicklow (Dr. Scharff); Cashel, Co. Tipperary (Lieut.-Colonel R. E. Kelsall); Ferns, Co. Wexford (Dr. Greene); Aghaderg, Co. Down (Rev. H. W. Lett); Cork (Miss A. N. Abbott); Holywood, Co. Down (Miss C. M. Patterson); Valencia, Co. Kerry (Miss Delap); Kilmartin, Co. Dublin (Dr. Trumbull); Malahide (do); Carrablagh, Lough Swilly (Mr. Hart); Glasnevin, Co. Dublin (Mr. Redding).

4. **A. (*Dendrobæna*) arborea**, Eisen. This diminutive worm was first described by Eisen in 1873. It appears to have been as entirely overlooked up till that date, as the last-named species was till eight years ago; and I have little doubt but that in future years, when the decaying forest trees of other lands come to be explored, we shall find several other species which up till the present time have passed altogether unobserved. The description of Eisen is true of our native species. Body cylindrical, prostomium large and pale, occupying about one-half of the first segment. Male pores on segment 15, tumid and conspicuous. Girdle for the most part composed of six segments, extending over 26-31. *Tubercula pubertatis* on the 14th and 15th segments behind the male pore, i.e., on segments 29, 30. The anal segment somewhat exceeds in length that which precedes it. The setæ are everywhere in distant pairs. Segment 50-60 (sometimes more in British specimens); length about 50 millimetres (not so great in my British specimens). First dorsal pore between 5 and 6. Like *Dendrobæna boeckii* (says Eisen), this species is found in old stumps of trees, into which, however, it penetrates further than the latter species. The specimens which I have examined were found deep in the wood, while the two other species (*A. celtica* and *A. eiseni*) were found, as a rule, less deeply imbedded. Eisen examined one specimen in which the *tubercula pubertatis* extended over segments 28, 31. At first sight the species resembles *D. boeckii*, remarks Eisen; and it is marvellous that he should found a genus for tree-haunting worms, and exclude from it his own *arborea*.

Synonym: *Allolobophora arborea*, Eisen, Om Skand. Lumb. 1873. Sub-species of *A. putris*, Rosa, Rev. dei Lumb. 1893.

DISTRIBUTION IN IRELAND.—Malahide, Co. Dublin (Dr. Trumbull); Leeson-park, Dublin (Dr. Scharff).

5. **A. (*Dendrobæna*) eiseni**, Levinsen. Up to the present time this

¹ "Attempt to Classify Earthworms," Q.J.M.S., xxxi., p. 260.

worm has happily passed through the hands of systematists invariably as *Lumbricus eiseni*, Levinson; but the time has come when it must be removed from the false position it has occupied undisturbed till the present. It must, however, be admitted that it does not fit in with the genus *Allolobophora*, though it belongs to this place as a true tree-worm.

The worm is small, cylindrical, slightly attenuated, usually about an inch, or at most an inch and a half, in length, *i.e.*, 30 to 40 millimetres. Its prostomium, like that of the true *Lumbricus*, forms with the peristomium a perfect mortise and tenon. It often closely resembles the typical *Lumbricus* in colour, being a warm brown, frequently with iridescence, and has the setæ in couples somewhat closer together. These are its only affinities in that direction. It lives in old trunks of trees and among decaying timber or woodland debris, is small, destitute of the two pairs of spermathecae which every true *Lumbricus* possesses, and in the matter of clitellum and its accessories is separated very widely from that genus.

The girdle covers eight segments, extending from 24 to 31; total number of segments, 90-110. There are no *tubercula pubertatis*; the male pore on segment 15 is on papillæ slightly developed, and the first dorsal pore is between 5 and 6. The constancy of this feature in the dendrobænic group is striking. Rosa submitted specimens exactly answering this descriptions to Levinson, who stated that they were identical with his *Lumbricus eiseni*.¹ The original specimens from Copenhagen were taken, according to Rosa's translation of Levinson's account, from old trees, and my British specimens have been obtained from similar habitats.

Synonym: *Lumbricus eisini*, Levinson (Syst. geogr. Oversigt over de nord. Ann. &c., Copenhagen, 1883). *A. eiseni*, Rosa, 1893. Dr. Rosa has done me the honour to place on record the fact that I was the first to assign this curious worm to its rightful place.

DISTRIBUTION IN IRELAND.—Woodenbridge, Co. Wicklow (Dr. Scharff); Valencia, Co. Kerry (Miss Delap); Malahide, Co. Dublin (Dr. Trumbull); Carrablagh, Lough Swilly (Mr. Hart); Leeson-park, Dublin (Dr. Scharff).

We are now prepared for a survey of the principal characteristics of the group.

§ DENDROBÆNA, Eisen.

Small tender worms, from 1 to 2½ inches in length, found in decaying trees, among dead leaves, and rotten vegetable matter; sometimes wandering to other habitats. Colour usually brown, rose-red or flesh, with dull clitellum and lighter-under-surface. Prostomium more or less deeply imbedded in the peristomium, which is without setæ. Setæ always in eight rows or in four couples, more or less distant, making the body appear octangular.

Girdle occupying five to eight segments, commencing somewhere between the 24th and 31st.

Male or spermiducal pores on segment 15, usually with prominent papillæ, which sometimes extend over the two adjoining segments.

Tubercula pubertatis in two or three pairs on consecutive segments; not observed in one species.

First dorsal pore usually between segments 5 and 6. Spermatophores between the male pore and the clitellum.

The internal characters have not yet been made out with sufficient accuracy by any investigator to allow of classification. Spermathecae are present in some species, but absent from others. When present they are open in the direction of the superior pair of setæ (Rosa).

Usually secreting a small quantity of yellow fluid from the dorsal pores.

The accompanying table supplies in concise form the principal distinguishing features of this interesting group of worms.

¹ Bolletino Mus. Zool. ed Anat. 1887, 1889.

TABULAR VIEW OF BRITISH ALLOLOBOPHORÆ.

§ *Dendrobæna*.

Name.	Clitellum occupies.	Tubercula pubertatis.	First Dorsal Pore.	Total segments.	Length.	Colour.	Prostomium imbedded	Setæ.
1. <i>celtica</i> , Rosa ...	31-36	33-34	5/6?	90-110	1-1½ in.	Brown or Rose-red.	Partially.	4 pairs wide.
2. <i>boeckii</i> , Eisen	29-33	31, 32, 33	5/6	90-100	1-1½ in.	Red-brown.	Two-thirds.	8 rows.
3. <i>subrubicunda</i> , Eisen ...	25-31	28, 29, 30	5/6	100-120	1½-2½ in.	Rose-red.	Partially.	4 pairs separated
4. <i>arborea</i> , Eisen	26-31	29, 30	5/6	50-80	1 in.	Rose-red.	Slightly.	4 pairs wide.
5. <i>eiseni</i> , Levinsen	24-31	0	5/6	90-110	1½ in.	Red-brown iridescent	Completely.	4 pairs close.

I beg to thank my numerous correspondents for their favours, and to inform them that my address in future will be "Fernbank, Cockermouth, Cumberland." As I must conclude my Irish researches this year, I shall be thankful to receive specimens from collectors at an early date, and should be specially glad to have typical series from those parts of the island which have not yet been worked. Living worms may be sent in tin boxes with soft moss, and should be marked "NATURAL HISTORY SPECIMENS."

(TO BE CONTINUED.)

THE SCALP, COUNTY DUBLIN.

BY G. H. KINAHAN, M.R.I.A.

SHOTOVER Hill is a godsend to the geological professors of Oxford, as no one will ever be able to determine the exact ages of its rocks; and similarly the Scalp is a godsend to the professors of geology in the Dublin schools, because, as to its age and the process of its formation, there have been numerous theories; and there will be, as long as there are successive generations of geologists in Dublin.

Jukes, to account for the transverse nearly N. and S. gashes across the S.W. Cork ridges, suggested that at one time there was high land to the northward, the drainage from which cut N. and S. transverse valleys. This theory he seems, however, to have afterwards abandoned; as, on more matured

examination and consideration, he found that the transverse valleys must have had a much more recent origin than the longitudinal ones.

A similar theory to that abandoned by Jukes was adopted by Prof. Hull to account for the Scalp. He considered that in the Co. Dublin there was high land to the northward, the drainage from which excavated the Scalp. He said nothing of the parallel valleys, such as those of the Slaney, etc., but, presumably, they ought also to be included. His view as to the Scalp seems now to be also adopted by Professors Sollas and Cole.

It seems to me indisputable, that the plain of Dublin was at one time much higher than at present, as a vast thickness of the Carboniferous limestone has been denuded away, and also of the Coal-measures, the latter alone being more than 4,000 feet thick. But at what time did this great denudation take place? And during this period of denudation, at what time was the granite ridge exposed? It is self-evident that the Granite, and its adjuncts, the Ordovicians, and the other older rocks, were protruded prior to the accumulation of the Carboniferous rocks; but, at the same time, it appears highly improbable, that at the time when there were high Coal-measure hills in the Co. Dublin, an iota of the old rocks came to the surface, the granitic and associated rocks never having appeared until after the envelope was removed; that is, not till after the Coal-measure hills of the Co. Dublin had disappeared. It cannot be denied that the granite ridge was a margin of a basin in the Carboniferous sea, as we find the littoral conglomerates of the Carboniferous high up on it; but was it always land during the Carboniferous epoch? or was it so near the surface as to be susceptible of denudation? that is, while the Carboniferous hills were high enough to send their drainage southward.¹

It has been suggested, I think, by more than one authority, that the Irish Coal-measures were denuded to form the Lias

¹ It is not only possible, but to me it seems probable, that old rocks, pre-Cambrian, Ordovician, and granite, formed hills margining the plain of Dublin to the south, and that of Kildare, Carlow, and Kilkenny to the east. This is proved by the blocks of granite found in the Kimmage limestones; but that the Carboniferous rocks extended over these hills seem to be problematical, as the Carboniferous rocks in Co. Wexford and

accumulations elsewhere; and if this is correct, the Carboniferous hills of the Dublin plain must have disappeared thousands and thousands of years before the Scalp existed.

But had the denudants anything to do with the Scalp? To me it would seem that they had not. Ireland was under water or ice, or some such envelope, and when "the dry land appeared," it contracted during the drying process, and shrinkage-fissures formed. This subject has been very exhaustively entered into in my work on "Valleys and their relation to Faults, Fissures, etc." and especially in chapter ii.

In 1878, I suggested in the "Geology of Ireland" that the Scalp was "probably excavated by marine action aided by ice along dykes of fault-rock." Since then, however, I have had opportunities of more carefully studying it and similar valleys, and would be inclined to suggest that it is nearly solely due to simple shrinkage-fissures, and that, since its formation, it has not been subjected to the effects of any denudants.

A study of the ravines, the adjuncts of the granite range of Leinster, shows that these are of different ages, some being comparatively recent. The ravine of the Liffey at Poulaphuca must be very modern, as the river-bed in which it formerly flowed southward is still very conspicuous and unchanged. The valley of the Slaney must have opened before or during the Esker sea period, as in it is found the marine drift. The valley of Tinnahely is probably older, as it is in parts occupied by moraine detritus; while the Devil's Glen, like the Scalp, is due to a movement that took place at quite a recent date. It may be allowable to suggest that the ravines at Poulaphuca, the Devil's Glen, and the Scalp, were formed at about one and the same time; that is, after the ice-cap had disappeared, and the Esker sea had retreated, so that now, in none of these, is there found drift of any kind, except meteoric accumulations, still daily forming.²

Waterford suggest estuarine accumulations; at the same time it must be allowed that these small areas may be the remains or roots of the formed Carboniferous sheet. Low down in the Queen's Co. and Tipperary fields there is a continuous massive sandstone made up almost solely of granite detritus.

¹ Trübner and Co., London, 1875.

² In the Scalp there are said to be foreign blocks; these, however, may have come down from the drift.

Let us suppose that the Scalp was excavated by a stream flowing south. If so, where is now the granite detritus that was excavated? The nearly total absence of all granite detritus in the drift of the Bray and Enniskerry valley is remarkable; in fact, you find nearly as many blocks of conglomerate (from Portraine and Rush) as of granite. It has been suggested that possibly the numerous pieces of limestone in the drift of the country south of the Scalp range came from the "Dublin Carboniferous hills" through the Scalp gorge. As, however, this drift in which the limestone is found is glacial, it would necessitate that the drift was carried by ice, not normal water; but in the Scalp there is not a trace of glacial or any other drifts, except æolian and meteoric. Compare the Scalp with the nearest valley, Glencullen. The latter must be much more ancient, as in it are different phases of the accumulation of drift—first, moraine matter that was subsequently denuded by the force that excavated the stream-ravine; then, still more subsequently, there were modifications due to meteoric abrasion and its adjuncts; the latter still taking place. In fact, this longitudinal valley must be more ancient than the transverse one.

In favour of the formation of the Scalp being due to a shrinkage-fissure, the enquirer's attention may be directed to the numerous facts recorded in the book already referred to ("Valleys and their relation to Faults, Fissures etc."). Numerous examples might be given of shrinkage-gorges, but we will only refer to one; as this valley, in its general characters, is very similar to the Scalp. The example to which I refer is Barnesbeg, Co. Donegal, through which the road from Kilmacrenan to the country on the northward has been made. To me it would appear evident that this valley owes its origin to a combination of shrinkage-fissures, one of which at least, as in the Scalp, caused a lateral displacement, but associated with them there is no record of any drift-forming agent. The fissures formed, while subsequently atmospheric abrasion and disintegration came into force, blocks falling from the different marginal cliffs to form rocky tali, the blocks being slightly modified by meteoric action, while the detritus thus formed was carried away by the winter and summer floods. Thus here, as in connection with the Scalp, there is no accumulation, that can legitimately be called drift,

which has been carried out of the valley, the sole drift being gravel, a mere bagatelle, due to runlets and streams during summer and winter storms. I purposely put summer before winter, as a summer downpour, acting on sun-baked rocks, carries down more detritus than winter rain.

NOTES ON THE FUNGI OF THE DUBLIN DISTRICT (COUNTIES OF DUBLIN AND WICKLOW).

BY GREENWOOD PIM, M.A., F.L.S., AND E. J. M'WEENEY, M.A, M.D.

[Read before the Dublin Naturalists' Field Club, 14th February, 1893.]

INTRODUCTION.—BY GREENWOOD PIM.

THE first attempt at a mycologic flora of the Dublin district appeared in the handbook compiled for the British Association meeting in 1878, and was published simultaneously in the *Scientific Proceedings of the Royal Dublin Society* for that year. It included about 470 species. In 1883 a short supplemental list of some sixty species was published by the Royal Irish Academy. Since then, with the exception of a few stray notes in the proceedings of the Dublin Microscopical Club in the *Irish Naturalist*, nothing bearing on this subject, so far as I am aware, has appeared.

During the ten years that have since elapsed, a considerable number of new species have come under my notice, notwithstanding that I have been able to devote but little time to the subject of mycology, and my colleague in this paper has also added a large number to the record. It seemed, therefore, desirable to gather together what has been done, and put it into a form available for future reference. It was, indeed, suggested that the former lists should be incorporated in the present one, so as to give a complete catalogue of the species hitherto met with in the district, but it was found that this would occupy too much space; moreover, it is very certain that there are many more forms still to record before anything like a complete mycologic flora of Dublin and Wicklow is possible. Hence only those not previously recorded appear in the annexed catalogue. The groups of Uredinei, Ustila-

ginei, and Alluviacei, form, however, an exception to this rule. Recent investigations have so completely revolutionized their nomenclature and arrangement that it has been thought necessary to give a complete list of all the species hitherto met with in the district. The extremely evanescent nature of many fungi causes a twofold difficulty in their study. Firstly, in a given district, at a given period, a species may occur abundantly of which no trace was visible a week before, or would be a week after. Secondly, they decay very rapidly, and hence when necessity arises—as it constantly does—of obtaining the opinion of another worker, by the time the specimen reaches him, it may be unrecognizable.

The list appended hereto contains about 245 species not included in previous lists, bringing the total number up to nearly 780. Of the aforesaid 245, eighty belong to the Agaricini, twenty-six to eighteen other orders of Hymenomycetes. Gasteromycetes (including Myxomycetes) number thirteen. Coniomycetes, amongst which are the Uredinei and Ustilaginei, forty-two. Hyphomycetes (including Peronosporæ) twenty-four. Discomycetes, thirty-six. Pyrenomycetes, twenty. The Agaricini generally are fairly well represented in the district, but the genus *Cortinarius* is conspicuous by its comparative absence, and the same may be said of the pink-spored division of the agarics, and of the woody or coriaceous genera. Two species of *Panus* are, however, recorded for the first time. Several new Polyporei are added to the list, and a few of other orders of the Hymenomycetes.

Amongst the Gasteromycetes, the occurrence in Powerscourt of *Cynophallus caninus* may be noted. Several additions are made to the Myxogastres, which are fairly represented, though perhaps not so numerous as might be expected, considering the dampness of the climate. Not a single new subterranean gasteromycete is recorded, nor is there anything to add in the corresponding group of Tuberacei, or Truffles.

The Uredinei and Ustilaginei (Rusts, Brands, and Smuts), are, perhaps, the most numerous, relatively, of any of the groups, no fewer than seventy-seven species being recorded, and it can scarcely be doubted that careful searching would reveal many more. Amongst the Hyphomycetes, a very curious minute form occurred on decaying passion-flower

leaves, parasitic on a larger mould. Mr. Grove considered it a new genus, which he honoured me with calling *Pimia*. Two remarkable forms occurred a few years ago on Silo grass at the Model Farm, Glasnevin, which are fully described in Mr. W. G. Smith's "Diseases of Field and Garden Crops," under the names of *Isaria fuciformis* and *Saprolegnia philomukes*. The peculiar and beautiful mould, *Myxotrichum deflexum*, occurred on a whitened wall at Royal College of Surgeons, along with the minute *Peziza domestica*, while Dr. McWeeney adds no less than six species of *Peronospora*.

Turning to the Discomycetes, some thirty-eight new species are noted, among which are the rare forms, *Vibrissea truncorum*, which recurs regularly every spring in the same spot in Powerscourt demesne, and also found by Dr. McWeeney in the Slade Brook, and *V. guernisaci* at Altadore. Even with these additions our list of Discomycetes is far from large. This seems strange, as though frequently not very prominent, they are not usually so small as to be very readily overlooked, and our climate and conditions seem admirably adapted to their production.

Of the Pyrenomycetes, the same remarks hold good, except as regards their size, which is generally very minute, which may possibly account for the exceedingly small number recorded. Amongst the additions is *Torrubia militaris*, a most remarkable object always found on dead pupæ, or caterpillars.

The large extent to which the following list is indebted to Dr. McWeeney, the initial letters in brackets (M'W.) will indicate, as representing the species found by him, (P.) is similarly appended to those for which I am responsible. There can, I think, be little doubt that careful investigation will be rewarded with many discoveries even in our best-worked localities, while almost the whole of the rest of Ireland is a *terra incognita* as regards Fungi. An exception must, however, be made as regards the north-east, which has been well explored by Rev. H. W. Lett, while a few species from Killarney and Glengariff may be found in my report in *Proceedings Royal Irish Academy* (Science) for 1885.

The following list has for convenience been arranged generally on the lines of that in Cooke's "Handbook," as being the book in most general use, although not quite up to modern ideas:—

LIST OF SPECIES.

HYMENOMYCETES.

AGARICINI.

- Agaricus (Amanita)**
phalloides, Fr.—Knocksink (P.), Powerscourt (P.)
excelsus, Fr.—Kilruddery (P.)
strobiliformis, Fr.—Glenarty (P.)
spissus, Fr.—Ovoca (P.)
lenticularis, Lasch.—Powerscourt (P.)
- A. (Lepiota)**
granulosus, Batsch—Powerscourt (P.)
 var. **broadwoodiæ** (?)—Mountpelier (M'W.); Glencullen (M'W.)
cepæstipes, Sow.—Monkstown (P.)
- A. (Tricholoma)**
nictitans, Fr.—Ovoca (P.)
cælatatus,—Ovoca (P.)
columbetta, Fr.—Glencullen (McW.)
vaccinus, P.—Whitechurch (McW.)
- A. (Clitocybe)**
inversus, Scop.—Powerscourt (P.)
difformis, P.—do. (P.)
bellus, Fr.—Glencullen (M'W.)
- A. (Pleurotus)**
septicus, Fr.—Friarstown (M'W.)
subpalmaris, Fr.—Hollybrook (P.)
acerosus, Fr.—W. Pier, Kingstown (P.)
- A. (Collybia)**
atratus, Fr.—Glenart (P.)
protractus, Fr.—Glencullen (M'W.)
plexipes, Fr.—do. (M'W.)
- A. (Mycena)**
hiemalis, Obs.—Powerscourt (P.)
capillaris, Schum.—do. (P.)
 Friarstown (M'W.)
filipes, Bull.—Glencullen (M'W.)
elegans, P.—Whitechurch (M'W.)
vitilis, F.—Glencullen (M'W.)
galopus, Schrad.—do. (M'W.)
stylobates, P.—Whitechurch (M'W.)
corticola, Schum.—Altadore (M'W.)
- A. (Omphalia)**
affricatus, Fr.—Glencullen (M'W.)
- A. (Entoloma)**
jubatus, Fr.—Glencullen, Mountpelier (M'W.)
- A. (Leptonia)**
æthiops, Fr.—Celbridge, Powerscourt (P.)
- A. (Pholiota)**
durus, Bolt.—Ovoca (P.)
præcox, P.—Rocky Valley (P.)
 Rush (M'W.)
leveillanus, D. & M.—Tullow (P.)
capistratus, Cks.—Near Lucan (M'W.)
marginatus, Blach.—do. and Mountpelier (M'W.)
- A. (Hebeloma)**
longicaudus, P.—Monkstown (P.)
eutheles, B. & Br.—Knocksink (P.)
- A. (Crepidotus)**
alveolus, Lasch.—Enniskerry (P.)
molis, Schaeff.—Loughlinstown (P.); Glencullen, Altadore (M'W.)
- A. (Naucoria)**
conspersus, Fr.—In store, Monkstown (P.)
- A. (Galera)**
ovalis, Fr.—In store, Dundrum (P.)
mniophilus Lasch.—On *Pellia*, Glencullen (M'W.)
- A. (Stropharia)**
melaspermus, Bull.—Kilruddery (P.)
stercorarius, Fr.—Seven Churches (P.), Glencullen (M'W.)
- A. (Hypholoma)**
epixanthus, Fr.—Powerscourt (P.), Whitechurch (M'W.)
velutinus, P.—Kilruddery (P.)
- A. (Psilocybe)**
ericaceus, Pers.—Glasamuck (M'W.)
clivensis, Bk.—Whitechurch (M'W.)

- A. (Psathyra)**
spadiceo-griseus, Schaeff.—
 Glencullen, Powerscourt (M'W.)
- A. (Panæolus)**
phalænarum, Fr.—(M'W.)
- A. (Psathyrella)**
disseminatus, Fr.—Monks-
 town (P.); Lough Bray (M'W.)
- Coprinus**
extinctorius, Fr.—Knocksink
 (P.)
tomentosus, Fr.—Rathgar
 (M'W.)
- Cortinarius (Inoloma)**
violaceus, Fr.—Glencullen
 (M'W.)
sublanatus, Fr.—do. (M'W.)
 Rathgar (M'W.)
- C. (Myxaciium)**
collinitus, Fr.—Mountpelier,
 (M'W.)
- C. (Dermocybe)**
anomalus, Fr.—Enniskerry (P.)
milittinus, Fr.—Glencullen
 (M'W.)
uliginosus, Bk.—Glencree
 (M'W.)
- Lepista**
cineraneus, Bull.—Enniskerry
 (M'W.)
- Hygrophorus**
nemoreus, Fr.—Hollybrook
 (P.)
- Lactarius**
tormenosus, Fr.—Monks-
 town, Altadore (P.)
pallidus, Fr.—Ovoca (P.)
rufus, Fr.—Scalp (P.); Glen-
 cullen (M'W.)
quietus, Fr.—Glencullen (M'W.)
zonarius, Fr.—Glencullen
 (M'W.)
- Russula**
adusta, Fr.—Powerscourt (P.)
heterophylla, Fr.—Ovoca (P.)
decolorans, Fr.—do. (P.)
rubra, Fr.—Glencullen (M'W.)
ochroleuca, Fr.—do. (M'W.)
depallens, Fr.—do. and White-
 church (M'W.)
sardonias, Fr.—do. (M'W.)
- Cantharellus**
lobatus, Fr.—Glencullen (P.)
tubæformis, Fr.—do. (M'W.)
- Marasmius**
epiphyllus, Fr.—Enniskerry
 (M'W.)
- Panus**
torulosus, Fr.—Near Lucan
 (M'W.); Powerscourt (P.)
stypticus, Fr.—Enniskerry
 (M'W.)
- Boletus**
granulatus, L.—Enniskerry
 (P.); Bray Head (M'W.)
cyanescens, Bull.—Ovoca (P.)
- Polyporus**
bombycinus, Fr.—White-
 church (M'W.)
melanopus, Fr.—Powerscourt
 and Kilruddery (P.)
rufescens, Fr.—Kilruddery (P.)
varius, Fr.—Powerscourt (P.)
elegans, Fr.—Powerscourt and
 Kilruddery (P.)
salicinus, Fr.—Monkstown (P.)
ulmarius, Fr.—Kilruddery (P.)
fraxinus, Fr.—Monkstown (P.)
obducens, Fr.—Near Lucan
 (M'W.)
- Daedalea**
unicolor, Fr.—Near Lucan
 (M'W.)
- Hydnum**
ferruginosum, Fr.—Kilrud-
 dery (P.)
- Craterellus**
crispus, Fr.—Ovoca (P.)
- Thelephora**
anthocephala, Fr.—Kilrud-
 dery (P.)
laciniata, Per.—Killakee
 (M'W.)
sebacea, Fr.—Altadore (M'W.)
puteana, Schum.—Altadore
 (M'W.)
- Hymenochæte**
corrugata, B.—Powerscourt
 (P.)
- Cyphella**
pimil, Phill.—On stem in water,
 Monkstown (P.)
- Solenia**
ochracea, Hoffm.—Kilruddery
 (P.)

NOTES.

BOTANY.

LIVERWORTS.

Ricciocarpus natans, Corda [**Riccia natans, Linn.**] **In Co. Dublin.**—While botanizing along the Grand Canal early last month (7th August), I discovered this interesting species growing in great abundance in a sluggish ditch, evidently long undisturbed, beside an old grass-grown road near Ballyfermott. The plant, mingled with *Lemna minor*, extends along the ditch here, at intervals, for more than a hundred yards, spreading its starry root-like processes over the surface of the water in a dark-brown sheet which at once arrests attention. Mr. David McArdle, of the Glasnevin Botanic Gardens, who has kindly examined my specimens and determined the species, assures me that he can find no record of its having been previously noted in the Co. Dublin, and supplies me with the following details as to its distribution in Ireland, so far as hitherto made out, the known stations for the species being (1) boggy pool between Navan and Drogheda; (2) ditch by the side of the Shannon, near Portumna, Co. Galway; (3) near Passy, Co. Limerick (Dr. Harvey); (4) ditch by the River Barrow, three miles below Athy, Co. Kildare (Mr. R. W. Scully).—NATHANIEL COLGAN, Dublin.

CLUB-MOSSES.

Lycopodium clavatum L. in Co. Armagh.—On August 10th I received from Rev. H. W. Lett a specimen of this plant, collected two days previously, on Brackagh Bog, south of Portadown, Co. Armagh; Mr. Lett describes the plant as plentiful in one spot. This is an interesting addition to the county flora, especially since the elevation of the bog in question is only fifty feet above sea-level; in the north of Ireland at least this Club-moss usually occurs on mountain heaths.—R. LLOYD PRAEGER.

PHANEROGAMS.

Euphorbia cyparissias L. in King's County.—In the early part of this year I received from Miss Margaret Goodbody, of Charlestown House, Clara, King's Co., some imperfect specimens of a plant unknown to her. They were a puzzle to me at the time, but subsequently proved to be the rare and peculiar *Euphorbia cyparissias* L. On the 23rd May last, I was taken to the spot, and found it profusely in flower and in considerable quantity, extending along a dry hedge-bank with one or two intervals for about twenty yards. It grows in a lane near Horseleap, about two and a-half miles from Clara, and the only house near it is a cottage, from the garden of which it does not seem likely to have escaped. In the "English Flora" it is looked upon as having been introduced, and no doubt the same applies to the specimen we are now considering, which is however remarkable from its remote situation, and the extent to which it has been established. On finding it, I immediately sent fresh specimens to Mr. A. G. More, and to Mr. Stewart, of Belfast, and have since placed dried specimens in the Herbarium of the Science and Art Museum, Dublin.—THOMAS CHANDLEE, Athy.

The Shamrock.—**A Postscript.**—In the paper on this subject, published in last month's number of the *Irish Naturalist*, I omitted through oversight to mention that the plant supplied to me by Mr. Bur-

bidge, from the stock grown in the College Botanic Garden, to meet the demands of English inquirers for the real Shamrock, was *Trifolium minus*, as were also the plants purchased from an advertiser in the Co. Louth, as the "true Irish variety."—NATHANIEL COLGAN, Dublin.

The Shamrock.—As Mr. Colgan, in his interesting paper of last month, was unable to include Kerry in his list of the counties using *T. minus* as the Shamrock, it may be of interest to mention that as I passed through the Gap of Dunloe, Killarney, in the month of July, I noticed that this was the plant (then in flower) offered to tourists by the mountain guides. It may also be here stated that so far as Cork in concerned, notwithstanding the fact that Mr. Colgan was sent two other species from this district, *T. minus* is the true Shamrock; it is this is selected for St. Patrick's Day by everybody who is sufficiently observant to notice that there are more species of trefoil than one, and it is this that is sold in the shops and in the streets, being distinguished by its small leaves and by the absence of the white and black markings which usually occur on the foliage of *T. repens* and *T. pratense*. I have seen people wearing *T. repens* ridiculed for decorating themselves with "clover." I was rather disappointed to find that the results of Mr. Colgan's painstaking investigation were not much more in favour of *T. minus*, as I have always looked upon that species as the Shamrock, even though many botanical works give the honour to *T. repens*. A fact which tends to show that *T. minus* is regarded throughout Ireland as the national badge is, that the manufacturers of Christmas and St. Patrick's Day cards on which sprays of real Shamrock are mounted, so far as I have observed on cards made in Belfast and Cork, invariably use this species.—R. A. PHILLIPS, Cork.

Clare Plants.—We have received from Mr. Patrick B. O'Kelly, of Ballyvaughan, Co. Clare, a "Complete List of the Rare Perennial Plants and Shrubs of the Burren Mountains of Ballyvaughan," which has been compiled by its industrious author, not merely to assist the cause of science, but with ulterior motives of a pecuniary nature. Indeed, a pretty smart price is affixed to many of the "rare perennial plants," and notwithstanding Mr. O'Kelly's assurance that they are all "real gems of the first water," few of us would care to pay the sum of 1s. for specimens of such plants as *Asperula odorata*, *Carex stellulata*, *C. sylvatica*, or *Nardus stricta*; or even a modest 6d. for *Reseda luteola*, *Juncus maritimus*, or *J. squarrosus*. In passing, we may mention that it is with some surprise that we learn that *Arabis thaliana*, *Chlora perfoliata*, *Erodium cicutarium*, *Gentiana campestris*, *Jasione montana*, *Linum catharticum*, and many similar plants are *perennials*! It is of interest also to find enumerated in the flora of the Burren mountains, *Lathyrus maritimus*, *Lysimachia punctata*, *Oenothera odorata*, *Narcissus major*, and "*Primula veris elatior*"—the editor of the new edition of "*Cybele Hibernica*" will please note. The names of some of the Ballyvaughan plants strike us as unfamiliar, such as *Chlora aureum*, *Melampyrum aquaticum*, *Rubia tinctoria*, and *Adiantum incisum*. Are these additions to the British flora which Mr. O'Kelly has made, or are they new to science? if the latter, they should be duly described. With the praiseworthy object of assisting in bringing our native plants more into cultivation in gardens, Mr. O'Kelly kindly volunteers to name any such plants which may be sent to him (return postage prepaid); but if the plants are returned labelled with such appellations as "*Anemone nemorosa purpurea Livingii*," "*Berberis vulgaris superbum*," or "*Trifolium repens purpurea folius*," we fear that serious injury may be caused to the enquirer's nervous system. Space does not permit of our availing ourselves of Mr. O'Kelly's kind permission to publish his price-list *in extenso* in the pages of the *Irish Naturalist*; but those who are interested in native plants should certainly write for it, as they will find in it much novel information respecting the local flora.

ZOOLOGY.

INSECTS.

Lemaerichsoni, Suffr., at Santry, Co. Dublin.—Examining some specimens of *Lema* collected by me last May, I noticed one which was very distinct from *L. lichenis*, and greatly resembled the rare *Lema erichsoni*. On sending it to Canon Fowler, the identification was confirmed. I succeeded in taking several more specimens on subsequent collecting excursions to the same locality. Dr. Power's capture of *L. erichsoni*, near Waterford, in the autumn of 1857, seems the only record from Ireland. The coleopterist in whose district *L. melanopa* is known to occur, should make a good search for *L. erichsoni*, as the British examples are considered by some authorities referable to an unnamed concolorous variety of *L. melanopa*, and Canon Fowler has described the last-mentioned insect as probably widely distributed in Ireland. The specimens of *L. erichsoni* were taken by sweeping.—J. N. HALBERT, Dublin.

Wasps in Co. Antrim.—In the July issue of the *Irish Naturalist* there is a note on Irish Wasps from Mr. G. H. Carpenter.—I beg to send a list of Wasps collected by me in 1887 at Cushendun, Co. Antrim, and verified by Mr. F. W. Elliott, of Buckhurst-hill, Essex:—*Vespa norvegica*, *V. sylvestris*, *V. vulgaris*, *V. rufa*, and *V. germanica*.—SL. ARTHUR BRENAN, Knocknacarry, Co. Antrim.

Sirex gigas and Acherontia atropos in Co. Antrim.—These two insects were taken in August, 1892, at the Cushendun coastguard station, and are both new to this locality.—SL. ARTHUR BRENAN, Knocknacarry.

Gonopteryx rhamni and Nonagria arundinis, near Limerick. I captured the "Brimstone" butterfly in Cratloe Wood, Co. Clare, on the 12th and 18th August, 1893. Two specimens (both males) in beautiful condition, were taken. The record is of considerable interest, as the insect has so far been taken in Ireland only at Killarney, and near Kylemore, Co. Galway. It is a common butterfly in England, appearing early in the spring after hibernating, when it is very often observed. In August, 1892, whilst gathering Reed-maces (*Typha latifolia*), usually designated "Bullrushes," to my surprise I observed several of the stems contained the living pupæ of a fair-sized moth. I took examples so affected, near Coonagh, Co. Clare, and also at Mungret, Co. Limerick, but unfortunately failed to secure any imagos of the insect, those which emerged making good their escape, owing to the difficulty of keeping the pupæ moist in the long stems of the plants. This season I have been more fortunate, and have bred some sixteen good specimens from plants gathered near Mungret and Castleconnell, thus satisfactorily proving the identity of the insect as the "Bullrush" Moth (*Nonagria arundinis*), hitherto recorded only in Ireland from counties Down, Cork, and Wicklow.—FRANCIS NEALE, Limerick.

MOLLUSCS.

Trochus duminyi and Odostomia delicata on the Irish Coast.—I spent the last week in June at Bundoran, but owing to a most adverse change of weather, a gale from the north-west with rain, I was not able to work on the shore as I wished, and it was only the day before I returned home, that I was able to procure some promising drift. My great hope was to obtain *Trochus duminyi*, and I am happy to say that three specimens were found in the portion searched. I got one, and Mr. Marshall, of Seven Oaks, Torquay (with whom I shared the drift), secured two. He also records the occurrence in the same drift, of the new shell *Odostomia delicata*; he says "this shell was described by the Marquis de Monterosata in the *Journal de Conchyliologie* (1874, p. 267) as Mediterranean, and it is figured in Sowerby's 'Index of British Shells,'

as *Chemnitzia similima*, Montagu, dredged in the 'Porcupine' Expedition off Donegal bay." It is a curious coincidence that I have to record these two rare shells from Killala bay also. Early in July, I was fortunate enough to procure some shell-drift from the sandy shore of Bartra Island, a portion of which I sent to Mr. Marshall, and he got one specimen of each of these shells; this is the second *T. duminnyi* found in Bartra drift, and Mr. Marshall has one from near Portrush; he thinks it probable that it may be scattered along the coast, though rarely.—AMY WARREN, Ballina.

Testacella scutulum, Sow.—In my record of this species in the July number, I omitted to mention that its discovery in the Co. Dublin is really due to Mr. W. F. Burbidge, who found it some years ago in the Botanic Gardens of Trinity College, Dublin.—R. F. SCHARFF, Dublin.

FISHES.

Ray's Bream—A Correction.—On page 230 of our last issue "Dungannon" should read "Dungarvan."

BIRDS.

Montague's Harrier (*Circus cineraceus*) in Ireland.—A specimen of this rare Irish bird was shot by Mr. Power's gamekeeper at Glenasmole, on the 3rd of July, where, according to his account, it had been feeding on young Grouse for some time previously. The bird is a male, in second year's plumage. A rather curious fact about the occurrence of this species in Ireland is that, out of five recorded occurrences, four were either on the Dublin mountains, or in their immediate vicinity.—E. WILLIAMS, Dublin.

White-winged Black Tern (*Sterna leucoptera*) in Ireland.—A specimen of this beautiful bird has been obtained in the immediate vicinity of Newmarket-on-Fergus, Co. Leitrim, where it was engaged in hawking for flies over a small lake. This is, I believe, the fifth recorded occurrence of this bird in Ireland.—E. WILLIAMS, Dublin.

Stock-Doves (*Columba ænas*) at Rostrevor.—Dr. V. Ball F.R.S., hands us the following letter from Mr. A. S. G. Canning, of The Lodge, Rostrevor, Co. Down:—

"I write to mention a fact which may interest all lovers of natural history in this country. It is the appearance at this place of what seems to be the Stock-Dove (*Columba ænas*). Two pair or more have nested here this summer, and there are two young ones now not yet fledged. They make their nests on the ground near or in rabbit holes, and under whin bushes. They are smaller than the Cushat, and have no white on them. Perhaps you would like to communicate what I have written to any naturalists of your acquaintance."

GEOLOGY.

Visit of the Geologists' Association to Dublin.—During the last week of July an event of much interest to local geologists took place—the visit of the Geologists' Association of London to Dublin. Our English fellow-scientists turned out in good numbers, and, when joined by the local recruits, made a party of quite formidable dimensions. An excellent week's programme had been drawn out by Professors Sollas and Cole, and under guidance of these and other local experts, Portlaine, Howth, Killiney, Bray, and other spots of geological interest in the neighbourhood were seen to full advantage, especially since the visitors were favoured with magnificent weather throughout their stay. We were not surprised to hear that the English visitors were charmed with their visit to the Irish capital, and with its geological surroundings, and we learn with pleasure that another Irish excursion is already spoken of—this time to Belfast and its beautiful district.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise Fish from Mr. Godden, a pair of White Rats from Mrs. Elliott, a pair of Badgers from the Earl of Clonmel, a Nightjar from J. Bates, Esq., and a pair of Barn Owls from N. McLean, Esq.
14,489 persons visited the Gardens in July.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

JULY 21st.—Annual Meeting, the President (PROF. FITZGERALD, B.A.) in the chair. The Secretary (MR. R. M. YOUNG, M.R.I.A.) submitted the annual report, and the Treasurer (MR. J. BROWN) the statement of accounts, which were adopted, on the motion of Rev. Mr. Kinghan, seconded by Dr. McCormac. The report of the Ulster Fauna Committee, which was next submitted, showed that information respecting the local fauna was being steadily collected. A list of donations to the Museum was read, and a vote of thanks passed to the donors. The existing office-bearers were re-elected for the coming year; and a motion authorising the council to exchange duplicate specimens of Irish antiquities for geological specimens with Mr. W. F. Praeger, Keokuk, U.S.A., concluded the business.

BELFAST NATURALISTS' FIELD CLUB.

JULY 29th.—Excursion to Ballynahinch. A large party proceeded by rail to Ballynahinch, and visited the ancient graveyard of Killgoney, where are the remains of a cromlech. After a halt at Magherahamlet the well-known spa claimed attention. Subsequently Montalto demesne was entered, where the lake-margins were found to be fringed with the Sweet Flag (*Acorus calamus*). Among the Lepidoptera taken during the day were *Vanessa atalanta*, *Chareae graminis*, *Crambus tristellus*, *Argyrothecia mendica*, and *Dictyopheryx contaminata*. At the business meeting held after the tea-hour the best thanks of the members were returned to Rev. Father Quail, P.P., for his unremitting kindness and attention to the party during the day.

DUBLIN NATURALISTS' FIELD CLUB.

JULY 29th.—Excursion to Lough Bray and Luggala in conjunction with the London Geologists' Association; a number of members of the Belfast Naturalists' Field Club were also present. The combined party, numbering between seventy and eighty, proceeded by 9 a.m. train to Bray, and drove via Enniskerry to Lough Bray, where an hour was spent. Thence the route lay through Sally Gap to Lough Tay, where the party descended on foot to the lake and walked through the grounds of Luggala Lodge, subsequently returning by car to Bray. On account of the large extent of ground covered, time did not permit of much collecting. The local *Andromeda polifolia* was observed in some quantity on bogs by the military road to the eastward of Lough Bray, at 1,650 feet elevation. *Listera cordata*, *Lastrea æmula*, and *L. montana* were gathered about Lough Bray, and *Wahlenbergia hederacea* on the way thither.

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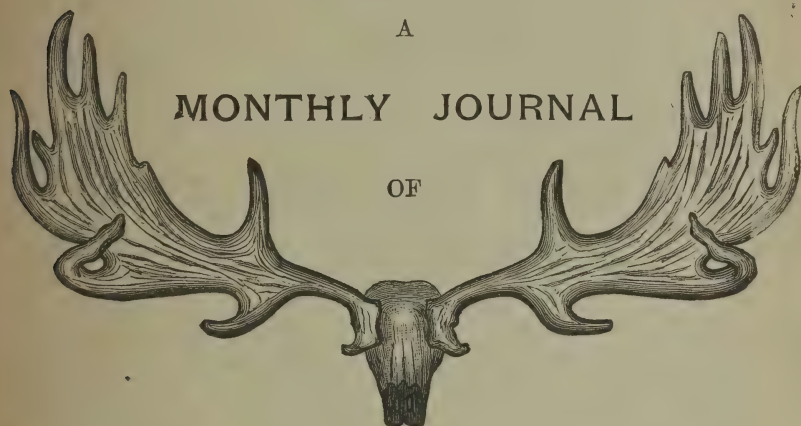
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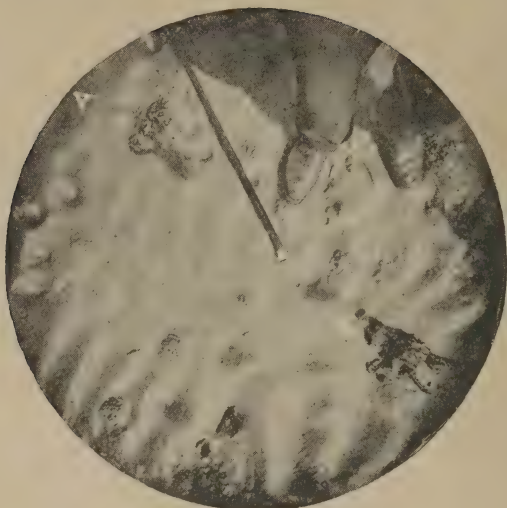


Fig. 1.

The track starts at **A**, and ends in a pit just beneath the handle of the walking-stick. Piece of seaweed, attached to stone, at **B**.

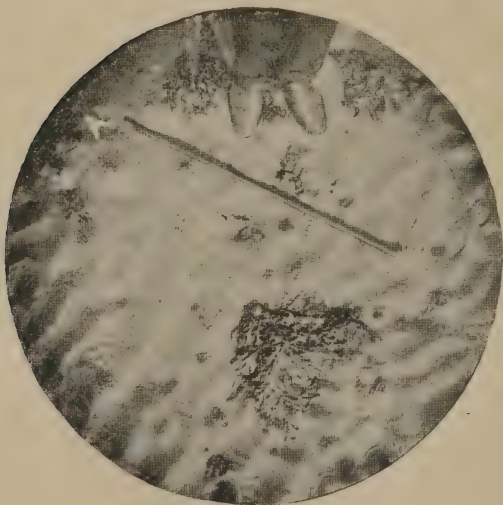


Fig. 2

The track starts at **A**, and ends in the pit below the centre of the figure. The stone to which the seaweed is attached lies in the pit.

SEAWEED TRACKS IN SAND.

The Irish Naturalist.

VOL. II.

OCTOBER, 1893.

No. 10.

SEAWEED TRACKS IN SAND.

BY PROF. W. J. SOLLAS, LL.D., F.R.S.

THE shining, level, sandy flats of the seashore, spreading like a satiny quilted margin to the land, possess a charm to which we all succumb. The youngsters with their toy spades, the artist, and scientific wanderers of many kinds, open their ears to the enticement "Come unto these yellow sands," and though with various aims they go, their pleasure is the same.

Our coast is rich in wide expanses of rippled sand, but rarely will the geologist find one more full of interest than that which occurs at Sutton, on the coast of Howth. The ripple-marks, in their diverse character, afford an interesting study in connection with those so commonly met with on the sandy surface of ancient bedded rocks; the pits and hillocks which mark the home of the lobworm underground, will call to mind the trumpet-mouthed burrows which penetrate the Cambrian quartzite at Bray; and the crabs, sidling speedily to some lurk-hole, leave impressions on the sand that we may take careful note of, hoping some day to parallel them with problematic markings on the sands of ancient buried seashores. Less familiar than these common seashore sights are the long tracks to which we now call attention. Varying in width, frequently about an inch across, with raised margins, and a central groove which is minutely ridged and furrowed transversely, they run for long distances, undulating in wide curves (plate 6, fig. 1) to end in a little well-marked pit. To the question, "What made them?" everyone I have asked has immediately replied to the effect: "Evidently a wandering

worm, or perhaps some kind of mollusc, say, a periwinkle for instance." Clearly: and there is the pit at the end, where he has gone underground! If we had a spade we would dig him out! As we have not, let us trace quickly a few of these grooves to the end, and see if we can catch sight of the creature in the act of making tracks.

In doing this we find that some of them extend for a long distance, one is measured twenty-three feet in length, but we never catch the culprit; and curiously enough, many of the tracks end beneath a piece of seaweed. It seems to be a very intelligent kind of animal that finds its path always to the same kind of shelter. Let us turn the seaweed over and see if it is underneath. No success; but in doing so we come across a curious find; attached to the seaweed is a little stone which lies in the terminal pit, and is just as broad as the furrow is wide (fig. 2). If we return to fig. 1 we shall see there also is a piece of seaweed sticking to a stone, and lying quite close to the end of the furrow. The murder is out; after all no animal was responsible, neither worm nor mollusc, simply a tuft of seaweed, dragging a stone after it as it was drifted seaward by the ebbing tide. The stone scores the furrow, driving out the sand to make a ridge on each side of its trail, and since, like every movement in nature, its progress is not continuous but interrupted, so the bottom of the furrow is not even, but ridged across at frequent intervals, and, as it were, rhythmically.

The story is instructive to the student of fossil markings, but it would be rash to conclude that every long ridge and furrow which has been attributed to annelids is a mere mare's nest. Both worms and molluscs do make tracks in the sand, and fossil examples of these are well known to exist, which, though not altogether dissimilar to those we have described, can be clearly distinguished by characters of their own.

The Earthworms of Ireland.—REV. H. FRIEND, whose new address is "Fernbank, Cockermouth, Cumberland," desires live specimens of Earthworms in damp moss, to enable him to make his lists of Irish localities as complete as possible.

NOTES ON THE FUNGI OF THE DUBLIN DISTRICT (COUNTIES OF DUBLIN AND WICKLOW).

BY GREENWOOD PIM, M.A., F.L.S., AND E. J. M'WEENEY, M.A., M.D.

(Concluded from page 249.)

HYMENOMYCETES.

- Typhula grevillei**, Fr.—Glen-cullen (M'W.) **Tremella viscosa**, P.—near Whitechurch (M'W.)
Pistillaria culmigena, Mont.—Foxrock (M'W.) **Apyrenium lignatile**, Fr.—Bray Head (M'W.)
Tremella indecorata, Schum.—Altadore (M'W.)

GASTEROMYCETES.

- Cynophallus caninus**, Fr.—Powerstcourt (P.) **Bovista plumbea**, P.—Whitechurch (M'W.)

UREDINEÆ.

[The arrangement of this order and of the Ustilaginæ has been so entirely revolutionized by recent investigations that it has been thought advisable to give a complete list of all the forms found in the district, arranged as in Dr. Plowright's book.]

Uromyces

- fabæ**, Pers.—Monkstown (P.)
geranii, DC.—Lucan, Dunran (M'W.)
dactylidis, Otth.—Ballybrack (P.); Lucan (M'W.)
poæ, Rabh.—Common (M'W.)
rumicis, Schum.—Killiney (P.); Bray Head (M'W.)
anthyllidis, Grev.—Bray Head (M'W.)
alchemillæ, Pers.—Friarstown and Glenasmole (M'W.)
ficularæ, Schum.—Rathfarnham (M'W.)

Puccinia

- galli**, Pers.—Lucan (M'W.)
calthæ, Lk.—Ballybrack (P.); Glenasmole (M'W.)
silenes, Schrst.—Skerries (M'W.)
variabilis, Grev.—Bray Head (M'W.); Ballybrack, Rocky Valley (P.)
lapsanæ, Schltz.—Monkstown (P.)
violæ, Schum.—Common (P.) (M'W.)
pimpinellæ, Strauss.—Common (M'W.)
apil, Ca.—Per Mr. F. Moore (P.)
menthæ, Pers.—Common (P.) (M'W.)
primulæ, DC.—Monkstown and Devil's Glen (P.)
pulverulenta, Grev.—Bray Head (M'W.); Ballybrack (P.)
saniculæ, Grev.—Common (P); Friarstown (M'W.)

- Puccinia vincæ**, DC.—Monkstown (P.) (M'W.)
graminis, Pers.—Common.
phalaridis, Plow.—Lucan, Wicklow (M'W.)
rubigo-vera, DC.—Not uncommon (P.) (M'W.)
poarum, Niels.—Common (P.) (M'W.)
caricis, Schum.—Common (P.) (M'W.)
obscura, Schröt.—Ovoca (P.)
arundinaceæ, Hed.—Ballybrack (P.)
moliniæ, Tul.—Leixlip (M'W.)
suaveolens, Pers.—Common (P.) (M'W.)
bullata, Pers.—Common (P.); Murrough (M'W.)
hieracii, Schum.—Kilmacanoge, Ovoca (P.); common (M'W.)
taraxaci, Plow.—Bray Head (M'W.)
oblongata, Lk.—Glendruid (P.)
centaureæ, Mart.—Common (M'W.)
pruni, Lk.—Rathgar (M'W.); Dalkey (P.)
smyrnii, Ca.—Common (P.); Dodder Bank (M'W.)
epilobii, DC.—Common (P.)
umbilici, Grev.—Scalp (M'W.); common (P.)
fergussoni, B. & Br.—Monkstown (P.)
fusca, Relh.—Lucan (M'W.)
bunii, DC.—Friarstown (M'W.)

Puccinia glomerata, Grev.—Lucan, Bray Head (P.) (M'W.); Ballybrack (P.)

malvacearum, Mont.—Common (P.) (M'W.)

circææ, Pers.—Not uncommon (M'W.)

veronicarum, DC.—Bray (P.)

glechomatis, DC.—Ennis-kerry (P.)

buxi, DC.—Mount Merrion (P.)

annularis, Strauss.—Devil's Glen (P.); Bray Head (M'W.)

Triphragmium ulmariaë, Schum.—Ballybrack (P.); Rathfarnham (M'W.)

Phragmidium fragariastris, DC.—Common (M'W.) (P.)

violaceum, Schltz.—Glencullen (M'W.)

rubri, Pers.—Very common (P.)

subcorticatum, Schrank.—Common (P.) (M'W.)

Gymnosporangium

juniperinum, Lev.—Powerscourt, Ashford (P.)

sabinæ, Fr.—Blackrock, per Rev. M. H. Close (P.)

Melampsora helioscopiæ,

Pers.—Common (P.) (M'W.)

lini, Pers.—Bray Head (M'W.)

farinosa, Pers.—Common (P.)

populina, Lev.—Fassaroe (P.)

hypericorum, DC.—Friarstown (M'W.); Dargle (P.)

betulina, Pers.—Glencree (M'W.)

Coleosporium senecionis,

Pers.—Common (P.) (M'W.)

sonchi, Pers.—do. (P.) (M'W.)

euphrasiæ, Schm.—Common (P.) (M'W.)

Æcidium grossulariæ,

Gmelin.—Common (P.)

periclymeni, Schm.—Bray Head (M'W.)

USTILAGINÆÆ.

Ustilago

segetum, Bull.—Common (P.) (M'W.)

flosculorum, DC.—Grey-stones, per A. F. Dixon (P.)

Tilletia tritici, Bjerk.—Fassaroe (P.); probably not uncommon, easily overlooked.

[The remainder of the list is arranged according to the nomenclature of Saccardo in his "Sylloge Fungorum"]

MYXOMYCETES.

Fuligo septica, Fr.—Glencullen (M'W.)

Spumaria alba, DC.—Fassaroe, Bray (P.)

Didymium squamulosum, A. & S.—Mount Merrion (P.)

Tilmadoche nutans, Pers.—Powerscourt (P.)

Stemonitis ferruginosa, Ehrb.—Monkstown (P.); Lucan (M'W.)

Urocystis

anemones, Pers.—Dalkey, Powerscourt, (P); not uncommon (M'W.)

violæ, Sow.—Rathfarnham, (M'W.)

Entyloma ranunculi, Bon.—Rathfarnham (M'W.)

Dictydium cernuum, Pers.—Glendalough House (P.)

Cribraria intermedia, Rost.—Dargle (P.)

Trichia

varia, Pers.—Glasnevin (P.) (M'W.)

chrysosperma, DC.—Common (P.) (M'W.)

Prototrichia flagellifer, B. & Br.—(P.)

CHYTRIDIACEÆ.

Protomyces

menyanthis, De By. — On plants received from Annamoe (P.); Murrough of Wicklow (M'W.)

Protomyces

macrosporus, Ung.—Goats-town and Rathfarnham (M'W.)

Synchytrium taraxaci, De By.—Dalkey (M'W.)

HYPHOMYCETES.

Stilbum

tomentosum, Schrad.—Powerscourt (P.); Altadore (M'W.)

finetarium, B. & Br.—Clonsilla (M'W.)

Stilbum

vulgare, Tode.—Glencullen, (M'W.)

Isaria fucliformis, Bk.—Glasnevin (P.)

Septosporium bulbotrichum, Ca.—Terenure (M'W.)
Pimia parasitica, Grove.—In Passion-flower leaves, Monkstown (P.)
Stachybotrys atra, Ca.—Monkstown (P.)
lobulata, D.—do.
Cephalosporium macrocarpum, Corda.—Monkstown (P.)
Oidium fasciculatum, B.—On orange, D. Frazer (P.)
Stysanus putredinis, Ca.—On decaying seaweed, per Mr. W. N. Allen (P.)

PHYCOMYCETES.

Plasmopara nivea, Ung.—Common (P.) (M'W.)
pygmæa, Ung.—Clonsilla (M'W.)
urticæ, Casp.—Common (M'W.)
Peronospora trifoliorum, De By.—Bray Head (M'W.)
schieldeni, De By.—Lucan (M'W.)
lamil, De By.—Lucan (M'W.)
Pythium de-baryanum, Hesse—On cress (P.)
Fœnaria, Pim.¹
philomukes (*Saprolegnia philomukes*, Smith).—On silo, Glasnevin. A fine description, with cut, of this curious species will be found in "Diseases of Field and Garden Crops," by W. G. Smith.

DISCOMYCETES.

Helvella lacunosa, Afz.—Glencullen (M'W.)
Vibrissea truncorum, Fr.—Powerscourt, recurring in the same place every spring (P.); Sladebrook (M'W.)
guernisaci, Crouan—Altadore (M'W.)
Geoglossum hirsutum, Pers.—Rocky Valley (P.)
difforme, Fr.—Glencullen (P.)
Monilla racemosa, Pers.—Monkstown (P.)
Zygodesmus sp.—Kilruddery (P.)
Menispora ciliata, Ca.—Friarstown (M'W.); Powerscourt (P.)
Verticillium nanum, B. & Br.—A form agreeing closely with this on *Marasmius*, Dalkey Island (M'W.)
Myxotrichum deflexum, Br.—On wall, R. Coll. Surgeons (P.)
Fusidium griseum, Lk.—Friarstown (M'W.)
Septocylindrium elongatisporum, B. & Br.—Glencullen (M'W.)
Torula parasitica, nov. sp.²—Monkstown (P.)
pulvillus, B. & Br.—Powerscourt (P.)
Bispora monilliformis, Ca.—(P.)
Spinellus fusiger, Lk.—On Agarics (M'W.)
Thamnidium elegans, Ca.—On fungi (P.)
Mortierella sp.—On fish manure (P.)
Pilobolus crystallinus, Tode.—Frequent (P.) (M'W.)
Chaetocladium brefeldii, Van Tiegh & Lemon—Monkstown (P.)

¹ Gen. nov. Described in *Gardener's Chronicle*, 22nd December, 1883, as "Mould on Ensilage."

² Extremely minute. Hyphasma well developed, creeping, giving off delicate spherical spores in strings. Parasitic on *Dematiæ*, damp paper, and leaves.

P. (Phialea)

virgultorum, Vohl.—Glen of the Downs (P.); Enniskerry (M'W.)

cyatholidea, Bull.—Lucan (M'W.)

urticæ, Pers.—Lucan (M'W.)

tuba, Bolt.—Enniskerry (M'W.)

Lachnea

bulbocrinita, Phill.—Lucan (M'W.)

coccinea, Jacq.—Powerscourt (P.)

Dasyscypha

bicolor, Bull.—Whitechurch (M'W.)

calyculaeformis, Schum.—Bray (P.)

canescens, Ck.—Altadore (M'W.)

sulphurea (Pers.)—Glencullen (M'W.)

aspidicola, B. & Br.—Kilma-shogue (M'W.)

Pyrenopeziza

atrata, Pers.—Powerscourt (P.)

PYRENOMYCETES.

Erysiphe lamprocarpa, Lev.—Monkstown (P.); Wicklow (M'W.)

montagnel, Lev.—Rathfarnham (M'W.)

Podosphaera myrtilina, Kze.—On *Vaccinium*, Glencree, Altadore, Dunran, (M'W.)

Microsphaera

dubyl, Lev.—Near Bray (P.)

berberidis, Lev.—Monkstown (P.)

Cordyceps militaris, Fr.—Powerscourt (P.)

Claviceps purpurea, Tul.—Ballybrack, Glendruid, Blackrock (P.)

Chaetomium comatum, Fr.—Monkstown (P.)

Nectria pulicaris, Tul.—Terenure (M'W.)

Xylaria

corniformis, Fr.—Bray (P.)

carpophila, Fr.—Mt. Merrion (P.); common (M'W.)

Pyrenopeziza

sarcoides, (Jacq.)—Kilruddery (M'W.)

Coryne clavus, A. & S.—Sladebrook (M'W.)

Calloria fusarioides, (Bk.)—Ballyowen, etc., (M'W.); Mt. Merrion (P.)

Ascobolus glaber, Pers.—Altadore (M'W.)

Ascophanus argenteus, Cur.—(M'W.)

Lasiobolus ciliatus, B. & Br.—Glencullen (M'W.)

Saccobolus violascens, Boud.—Glencullen (M'W.)

Ascomyces deformans, Bk.—Stradbrook (P.)

Pseudopeziza trifolii, Fuckel.—Bray Head (M'W.)

Stegia ilicis, Fr.—Common (P.) (M'W.)

Phyllachora graminis, Fuckel.—Bray Head (M'W.)

Ustil navicularis, Tul.—Dunran (P.)

Hypoxylon rubiginosum, Fr.—Dargle (P.)

Polystigma rubrum, P.—Ovoca (P.)

Cucurbitaria berberidis, Gray.—Monkstown (P.)

Rosellinia

thilina, Fr.—Monkstown (P.)

mammiformis, Pers.—Dargle (P.)

Lasiosphaeria hirsuta, Fr.—Glencullen (P.)

Trichosphaeria pilosa, Pers.—Powerscourt (P.) (M'W.)

Stigmatia

ostruthii, Fr.—Dodder (M'W.)

ranunculi, Fr.—Dodder and Mt. Merrion (M'W.)

Venturia ilicifolia, Cke.—Mt. Merrion (P.)

Hysterium commune, Fr.—Rathgar (M'W.)

SPHÆRIOIDÆ.

Piggotia astroidea, B. & Br.—Fassaroe (P.)

Septoria aceris, B. & Br.—Powerscourt (M'W.)

Glæosporium ficariæ, Bk.—Rathfarnham (M'W.)

Coryneum bejerinckii, Oud.—In cherry gum, Monkstown (P.)

THE BIRDS OF THE MIDLAND LAKES AND BOGS,
CHIEFLY AS OBSERVED IN THE BREEDING-SEASON.

BY R. J. USSHER.

(Concluded from page 238.)

The COMMON TERN is usually to be found on the larger lakes, on many of which it breeds, sometimes in colonies apart from other birds, sometimes with gulls, sometimes but a pair or two, but always on islands. I have met with Terns on *Lough Erne, Lough Arrow, *Lough Key, *Lough Allen, Lough Boderg, Lough Forbes, *Lough Oughter, *Lough Sheelin, *Lough Gowna, Lough Ree, Lough Iron, and *Lough Derg. On the latter I have found eggs on the 31st May, but on Lough Key and Lough Oughter, there were uncompleted clutches on the 12th June. On a large grassy island in Lough Gowna, which rises into a hill, a large colony of Terns had eggs in the first and second stage of incubation on the 10th June. These were laid here and there, in depressions in the grass, on the upper slopes of the hill, though fourteen cattle were grazing on the island, probably not long, as cattle usually drive Terns away by trampling on their nests. I found there one Tern's egg laid in a depression in a dried cow-dung, used as a nest. On an islet in Lough Key, within a short distance of the house and terrace-garden of Rockingham, were five Terns' nests round the margins of the soil, overhung by the bushes that occupied the centre. A similar, but much larger colony, occupied an islet in Lough Oughter. On two stony islands in Lough Allen I found Terns having eggs in hollows of the gravel, on the outskirts of a colony of Black-headed Gulls.

The BLACK-HEADED GULL is a bird to be met with everywhere in the breeding season in these counties. It breeds in colonies, large or small, both on islands in lakes, which are usually small and stony, and also on the great red bogs. In the latter the Gulls lay round the margins of the pools that occur in the wetter portions, as on Killeenmore Bog, in King's Co., where the hosts of Gulls that breed over so extended an area seem to increase from year to year, owing probably to protection. On a marsh of Lord Castletown's, in Queen's Co.,

I saw an enormous and very dense assemblage of Gulls breeding on the 15th April, 1893. Their nests were all on tussocks of sedge, standing out of shallow, muddy water, through which a punt was pushed. Few nests then contained eggs, though some clutches were complete. At Killeenmore Bog, on 30th April, 1892, many clutches were complete, but few sat upon. On the sheltered and crowded islets of Lough Key many young Gulls were able to swim on 12th June, 1891; but on the exposed stony islands of Lough Allen the eggs were not much incubated on 3rd June, 1893, and there were no young. Some nests were placed here within the shooting-shelters, built of loose stones; and on Lough Derg I saw a nest on top of a tall, conical stone beacon, on an island, while others were on boulders and masses of stone standing in the water. It is a very pretty sight to see these Gulls chasing moths in the twilight over a grass field. They continue to do so until eleven o'clock, if not later. I have met with Black-headed Gulls in April, May, and June, on *Lough Erne, Lough Arrow, *Lough Key, *Lough Allen, Lough Forbes, Lough Oughter, *Lough Gowna, Lough Ree, the Shannon near Banagher, *Killeenmore Bog, *Lough Derg, and *marshes near Granston. They are also reported to breed elsewhere, in Monaghan, Cavan, Leitrim, Roscommon, Galway, Westmeath, King's Co., Queen's Co., and Tipperary.

THE LESSER BLACK-BACKED GULL I have only met with breeding on Lough Erne, except on the sea-coast; yet I have met with it on so many lakes and rivers that I am convinced it must have many inland breeding places. I visited lower Lough Erne on 9th June, 1891, and on reaching a lonely island, whose centre was covered with luxuriant natural wood, with a wide, flat, stony beach, I found some twelve or fifteen pairs of this species nesting among the large stones on this beach, the nests being formed of dried flags and grasses. This colony must have been robbed, as some nests contained eggs far advanced and chipping, others but one or two fresh eggs; no other species of gull bred there. Mr. R. E. Dillon has shown me an egg answering to this species, taken on a bog near Clonbrock, in eastern Galway, and I have twice seen Lesser Black-backs on Lough Iron, Westmeath, in June, where the keeper informed me that he saw their young following them about the lake. I saw a pair in adult plumage on Lough Derg, on

27th May, 1893, and others elsewhere immature; and Mr. Parker tells me that he always sees these Gulls come about the 1st April, and that they remain during the breeding season, but disappear in winter. I have also seen them singly, or in pairs, in adult plumage, on Lough Key, Lough Allen, Lough Forbes, Lough Ree (two seasons successively), on the Shannon near Banagher, and again near Athlone, and on the Nore above Thomastown. Their love of the offal of towns doubtless attracted them to the last three places, but their presence in so many inland places in the breeding season is significant. I have never to my recollection met with the Herring Gull in midland counties.

The GREAT CRESTED GREBE breeds in small numbers on lakes from Hillsborough, in the Co. Down, and Castle Dillon Lake, Armagh, through the Monaghan lakes, and through the midland counties, on lakes great and small, down to the Clare end of Lough Derg, where I have taken its eggs on 27th May, 1893. The smaller lakes are frequented by one or two pairs; but on the larger lakes, like Lough Ree, many pairs breed, not always apart from each other, for I there found two nests with eggs on 7th June, 1892, in a very small lagoon, whose entrance just admitted a boat, and was unfrequented. The nests were flat platforms of rotten rushes, placed among beds of the tall rushes that grow in the water. On Lough Ree I saw a great many Grebes in different parts. I should say they have no greater resort in Ireland. On Lough Iron I saw a good many, and they admitted tolerably near approach without sinking their bodies deep in the water, as they do when alarmed. Mr. Collier, the keeper, thinks there are eleven pairs on Lough Iron. I have seen their eggs from thence. Colonel Malone has seen a Grebe drop two young ones that she appeared to have been carrying on the water. The note of the Grebe is a croak, which can be heard at a considerable distance. When it dives it draws the head back, points the bill downwards, then with a stroke of the feet submerges the breast and neck, and goes under without a splash. It will sometimes swim rapidly in one direction, dip its bill, and then swim rapidly in another direction. When watching the intruder the long white neck is held erect and the tufted head is easily distinguished. Grebes when approached on Lough Iron, where they are tame from protection, sometimes escape by flight rather than by

diving, as I have witnessed, and they then look not very unlike Mergansers on the wing, except that the large feet project behind. They select bays and parts of lakes sheltered by islands to breed in, and seem to avoid exposed lakes destitute of such refuges, like Lough Allen and Lough Sheelin, as the sweep of large waves would destroy their nests. I have found them on Lough Erne, Lough Arrow, Lough Key, Lough Gowna, Currygrane Lake, *Lough Ree, Lough Iron, Lough Drin, and *Lough Derg, and they have been reported to me from Lough Boderg, Lough Owel, where their eggs were taken, Lough Annagh, and Ballyfin, Queen's Co.

The LITTLE GREBE breeds throughout Ireland, but is particularly common on the midland lakes and parts of the Shannon. I never saw so many Little Grebes' nests as I met with on Lough Ree on 7th June, 1892, on floating lumps of aquatic herbage, the clutches being then usually incomplete, but one young grebe, just escaped from the shell, immediately took to the water when I approached, and dived, using its legs and wings under water, to come up and dive again. On Lough Key I met with a Little Grebe's nest built upon a stone which stood in the water, and was sufficiently cup-shaped to hold the nest. I have met with Little Grebes on Lough Arrow, *Lough Key, *Lough Sheelin, Currygrane Lake, *Lough Ree, Lough Iron, *Lough Owel, Lough Drin, the *Shannon near Banagher, and *Lough Derg.

The CORMORANT has breeding colonies in tall trees on some of the lakes. The most remarkable instance of this is at Lough Cutra, in Co. Galway, ten miles from the nearest tidal water, where, as Lord Gough informs me, "cormorants have always bred in numbers on Parson's Island, three and a-half acres in extent. They have from forty to sixty nests yearly, high up in the trees, very large nests, mixed up with a large rookery and heronry; also large numbers of Jackdaws, and, until lately, some hawks. All appear to live most amicably together."

On Hermitage Island, Lough Key, is a smaller colony, where, on 12th June, 1891, I saw fourteen nests in ash-trees about thirty or forty feet from the ground. In one nest were large young in down; in the others, fledged young. Several old Cormorants remained on these nests while we were beneath. Occasional Cormorants may often be seen on all the larger lakes.

The GREY LAG GOOSE is reported by Mr. Young to be "sometimes seen in Queen's Co. in winter," and by Lord Castletown to be "very rare." Mr. Digby states that in King's Co. there are "a few in the winter." He has shot them. Mr. Kinahan says that it is an occasional visitor to the callows of the Little Brosna in Co. Tipperary.

The WHITE-FRONTED GOOSE is stated by Colonel Malone to be the commonest goose which occurs on Lough Iron. Flocks are to be seen in the adjacent pasture-fields in winter, and in 1891 they remained well into May. Maxwell, the gamekeeper at Knockdrin, told me that on the 26th April, 1892, the latest date he saw geese, a flock flew over in V formation, out of which he counted thirty-five without exhausting them. In eastern Galway, Sir Henry Bellew states that this species is nearly as common as the Bean Goose. Mr. Digby informs me that in King's Co. it is common from October to April. When visiting Killeenmore Bog, on 30th April, 1892, I saw two flocks of White-fronted Geese, comprising twenty-four birds in all. On the 6th May Mr. Digby wrote to me that they had gone. In Queen's Co., Mr. Young states that it is a regular winter visitor. In Tipperary, Mr. Purefoy says it is an occasional visitor in winter.

The BEAN GOOSE is a winter visitor to Sligo (Col. ffolliott). In eastern Galway, Sir H. Bellew considers it to be the commonest goose. On the 7th February, 1893, one was shot out of a flock of about sixty near Mount Bellew. One shot in Co. Longford is preserved in Currygrane. In King's Co. Mr. Digby considers it fairly common, and in Queen's Co. Mr. Young says it is a regular winter visitor.

The BARNACLE GOOSE is, according to Sir H. Bellew, a common visitor to his part of Galway, as well as the Bean and White-fronted, and that there is no mistaking the sharp line of demarcation between the neck and the very white breast.

The WHOOPER SWAN is a winter visitor to Lough Arrow, often in large numbers (Col. ffolliott). In Longford Mr. Wilson states it is not numerous, but is seen occasionally. In King's Co. Mr. Digby has only once seen a flock passing over, and in Queen's Co. Lord Castletown considers it very rare, while Mr. Purefoy states that it is an occasional visitant in winter to Tipperary.

(It must be difficult to determine the species, as between

this and Bewick's Swan, where the birds are only seen at large, and not obtained.)

BEWICK'S SWAN. A specimen of this species, shot on Lough Iron by Colonel Malone, is preserved at Barronston. Mrs. Battersby informs me that small flocks of swans sometimes, but rarely, visit Lough Iron and Glen Lough. One shot at Granston Manor, about 1888, is preserved there, but Lord Castletown considers the species very rare. Mr. Kinahan says that on the callows of the Shannon very large flocks of swans sometimes appear, and a few small flocks yearly. He believes that both species occur there.

The **WILD DUCK** is reported to breed in every county in Ireland, numerous in Fermanagh, Cavan, Leitrim, Roscommon, Longford, Westmeath, King's and Queen's Counties. I have met with it on all the lakes I have visited, breeding in numberless instances. It breeds both among the heather on the red bogs, and in the sedgy vegetation on islands in lakes. On the marshes near Granston, in Queen's Co., great numbers were sitting on eggs, on the 14th April, 1893, often amid slight herbage; but I have found fresh eggs on the 9th June, on Lough Erne. I was shown three trees at Barrowston in which Wild Ducks had nested. On the 2nd June, 1892, as I was exploring an island on Lough Derg, where Wild Ducks breed, a Mallard flapped along before me, as a duck would, so as to draw me away from its brood. This shows that the male is not indifferent to the safety of his family. On the 12th June, 1891, the Mallards on Lough Key were beginning to change their plumage, their necks showing brown.

At Kellyville, on the borders of Queen's Co. and Kildare, a lake of fifteen acres in extent, in the demesne, has been preserved for a very long period as a duck decoy, and is carefully looked after by the owner, Mr. Webber. From the approach, one can see in winter the greater part of this lake swarming with multitudes of ducks, chiefly of this species and Teal, but also including numbers of Wigeon with many Pintails, Shovellers, Tufted Ducks, and Pochards, the two latter species keeping apart from the dense crowd of Wild Ducks. As darkness comes on, one may hear flock after flock leaving the lake to feed over the country, and return next morning to spend the daytime on Kellyville Lake. When the lake is frozen they sit on the ice, covering five or six acres, the numbers

being then estimated at six or seven thousand. Large flights of fresh Wild Ducks arrive in December and January; these are slighter in body and appear tired with their flight, sleeping all day on the banks; after some weeks they get fat and heavy.

The GADWALL is recorded to have been shot at Knockdrin, Westmeath. Lord Castletown informs me that at Granston Manor, in Queen's Co., three specimens have been shot, and Mr. Young says that a few have been seen in winter in his part of the county.

The SHOVELLER was not known to Thompson as a species breeding in Ireland. There is much reason to think that it has greatly increased since his time, especially of late years. I have met with Shovellers on Castle Irvine mill-dam, on Lough Erne, Lough Key, Lough Iron, *Lough Derg, at both ends of the lake, and on the marshes near Granston. It has been stated by the late Sir Victor Brooke to breed at Castle Irvine, by Colonel Cooper in Sligo, by Mr. Levinge and Rev. P. Keating in Roscommon, by Macpherson, the gamekeeper, at Derrycarne in Co. Leitrim on the Shannon, by Mrs. Battersby in Westmeath, and by Collier, the keeper, at Barronston in the same county, by more than one person at Banagher to breed on the Shannon near that town, by Mr. Wood on the Brosna, by Captain Fox in King's Co., by Mrs. Croasdaile in the north of Queen's Co., and by Lord Castletown in the marshes at Granston. It has bred also in several other parts of Ireland. On the 2nd June, 1892, I was on a small island in Lough Derg, when a brood of little flappers rushed from me into the water. The parent duck immediately flew out in front, displaying herself to draw me off. She was a Shoveller with broad bill and pale-blue wing coverts. Mr. Kinahan had long previously shot young Shovellers in the same locality. On the shores of Glen Lough, Westmeath, in 1891, I was shown the nesting-hollow in a tuft of sedge on coarse rushy pasture, from which the eggs of a Shoveller, now in Mrs. Battersby's collection, had been taken that season. On Lough Erne I saw a male and female Shoveller, near Devenish, but in other instances males only, leading me to infer that their mates were hatching, or more probably, rearing young. On Grans-ton marshes, on the 14th April, 1893, I saw many Shovellers in pairs, and observed a female fly off from some tussocks of bog-myrtle, among which I found a nesting-hollow, though no

eggs were laid. Lord Castletown showed me a Shoveller's egg taken long since from the same marsh, where Boyce, the keeper, states that he has seen a brood of Shovellers on the wing this summer, and that these birds breed there commonly; so does Collier, the keeper, at Barronston, where he says he found several Shoveller's nests in the spring of 1893, with eggs up to nine in number. He remarked that he never saw flocks of Shovellers before the winter of 1892-93, when he observed them on Lough Iron. This increase of Shovellers in winter has been noticed on Lough Annagh the last two winters by Mr. Dunne, of Brittas, and Colgan, his keeper. Mr. Young states they are numerous in Queen's Co. in winter. At the Kellyville decoy few were usually taken until the winter of 1889-90, when fifty-eight were taken, in 1890-91 fifty-two, in 1891-92 twelve, and in 1892-93 forty-one. This summer, 1893, Mr. Webber states that a fair number are to be seen, *e.g.*, on the 10th August he saw nine fly over the lake, probably a young brood bred in the neighbouring bogs or marshes.

The PINTAIL can hardly breed in Ireland in any considerable numbers. I have no evidence of its breeding recently, but Lord Castletown has an egg which he took when a boy from a Pintail on the marshes near Granston Manor. Both he and Mr. Young speak of this species as a regular winter visitor to Queen's Co. I saw a good many on the lake at Kellyville which they frequent regularly in winter, and with the Shovellers and a few Tufted Ducks remain there well into April, leaving before May. Previous to 1889 the highest number taken in the decoy there was fifteen in 1883, while in 1884, 1885, 1886, and 1887, none were taken. In 1889-90 fourteen were taken; in 1890-91 forty-four, in 1891-92 fifty-six, and in 1892-93 forty were taken. In King's Co., Mr. Digby has only once seen Pintails there in a very hard winter. Mr. F. Dunne has a pair obtained on the Little Brosna.

The TEAL is reported to breed in every Irish county except Dublin and Carlow, breeding numerously in Fermanagh, Leitrim, Longford, King's and Queen's Counties. I have seen it in the breeding season at Castle Irvine, *Lough Arrow, *Lough Boderg, *Lough Oughter, Lough Iron, Lough Annagh, the Shannon near Banagher, Mount Bellew Lake, and the marshes near Granston, and have found its nest among the heather on a great red bog near Clonbrock, Co. Galway. In

such a situation, not in rushes, numbers breed on Killeenmore bog and other great bogs. As a winter visitant it must far exceed in numbers any other species of duck, if one may judge by the comparative numbers taken in the Kellyville decoy, the great majority of which are Teal. Mr. Webber says:—"There are a lot of Teal, several hundred, that remain on the lake until May, and come in again, young and old, in August and September. The foreign ones come in thousands about 1st to 20th November, and leave about 15th March. These are distinguishable by being lighter in body, and having a yellow tinge on the breast when they first come."

The WIGEON has only been seen by me once in the breeding season. On 3rd June, 1893, I visited Lough Allen, in Co. Leitrim, a lake where there is very little fishing or boating owing to the dangerous mountain squalls. From a stony island, inhabited by a colony of Black-headed Gulls, a fine male Wigeon got up, and another bird, which appeared to be the female, flapped about and disappeared. I searched in vain for a nest among the large stones composing the island, and returned several hours later, but did not see the Wigeon again. Wigeon have been reported to me as breeding in a few instances, but not with sufficient proof to put a mistake out of the question. As a winter visitor the Wigeon is common on the midland lakes, *e. g.*, Lough Arrow (Col. ffolliott), Westmeath lakes (Mr. Levinge), King's Co. (Mr. Digby), Queen's Co. (Lord Castletown, Mr. Young, and others). At Kellyville, in 1881, one hundred and thirty were taken, then none for six years. In 1888-9, thirty were taken, in 1889-90, one hundred and thirty-nine, in 1890-1, two hundred and ten. Since then but few have been taken.

The POCHARD is another duck of whose breeding in Ireland I desire further proof, though I have more reason to think that it does breed than the Pintail and Wigeon.

On the 6th July, 1893, a male Pochard, in transition plumage, was shot on Currygrane Lake, Co. Longford, and is in the Dublin museum. Young Pochards are stated to be met with occasionally on the Roscommon shore of Lough Ree. Maxwell, the keeper at Knockdrin, Westmeath, stated that in 1891 a pair of Pochards had a brood of seven young, on Brittas lake, in the demesne. He did not know their name, but described the male as having a red head and grey back. I am informed

by Mr. Purefoy and Mr. Bagwell that a pair of Pochards bred on the lake at Martfield, near Clonmel. It is a place where breeding wild fowl are tame from protection, as I observed. I do not think a mistake can have been made in this instance. I have seen Pochards lurking about small wooded lakes occasionally, in April; and it is on such lakes, rather than on those that are large and open, that I should expect them to breed. Mrs. Croasdaile saw one on 17th May, 1873, on a lough in Queen's Co. The Pochard is a winter visitor to Sligo, Queen's Co., and probably to most parts of Ireland. I saw a number of Pochards on the lake at Kellyville, but they are never taken in the decoy. After their arrival they may remain for some weeks, leaving Kellyville if frost sets in, to return again in February, remaining until April.

The TUFTED DUCK is another species known to Thompson as a winter visitant only, which, nowadays, at all events, breeds commonly on several of the midland lakes. I have found it in the breeding season on *Lough Erne, *Lough Arrow, *Lough Key, Lough Forbes, Lough Gowna, *Lough Ree, Lough Iron, and Lough Derg, while Mr. Levinge reported it to me from Lough Drin, in June, 1892. On Lough Erne Mr. Bloomfield has observed the great increase of Tufted Ducks breeding of late years. Previously to 1877, he only knew them as winter visitants. I have found their nests among flags on stony islands, occupied by Black-headed Gulls and very near their nests, upon high sloping ground on islands covered with rushes among which it bred, and among sedge on small low islets. The eggs are not laid until the beginning of June; at least those that I took on the 6th and 9th June were fresh. When their breeding-haunts are invaded, Tufted Ducks quietly swim away, and then remain watching the intruder from the water not very far off. I saw ten together thus on Lough Arrow; on Lough Iron I saw Tufted Ducks in many places, in one place seven together on the 14th June, 1891. Their cry is a croak uttered on the wing. In winter Tufted Ducks are frequent in Queen's Co. (Mr. Young). I have seen several on the decoy lake at Kellyville, but like the last species the Tufted Ducks never enter the pipes.

The GOLDEN EYE in adult male plumage, obtained locally, is preserved at Castle Hamilton, Co. Cavan, Knockdrin in

Westmeath, and Castle Lough on Lough Derg, Tipperary. It is reported as a winter visitant from Lough Arrow (Col. ffoliott), and Queen's Co. (Mr. Young).

The GOOSANDER is stated by Mr. Digby to have been seen by him on one or two occasions in King's Co., and Mrs. Battersby knows of one shot in Westmeath. Mr. Parker mentioned another shot on Lough Derg.

The RED-BREASTED MERGANSER is one of the commonest ducks on the larger lakes, and is a most characteristic bird in the breeding-season, when I have met with it on Lough Erne, Lough Arrow, Lough Key, *Lough Allen, *Lough Sheelin, Lough Gowna, Lough Ree, *Lough Owel, and Lough Derg and in almost all parts of those lakes. Where numerous wooded islands occur, as on Lough Erne and Lough Key, each seems to be tenanted by one or more pair of Mergansers (known as Shell Ducks), but even in June, their breeding time, one sees occasional assemblages of adult birds. Thus, on an island in Lough Derg, I saw thirteen Mergansers, nine in one flock and two pairs, on 31st May, 1892. From an island in Lough Owel, nine took flight, which were on the water inshore, then two more, and afterwards we found two females sitting on fresh eggs among the dense flags that covered the bank of the island. On 3rd June, 1893, I came upon a Merganser sitting on ten fresh eggs among the bed of meadowsweet that encircles an island in Lough Allen, between the stony shore and the trees that occupied the centre, a distinct path or run leading from the nest to the water. A nest also containing ten fresh eggs was found on an island in Lough Sheelin, on the 11th June, 1892. It was a depression among rough gravel and angular bits of limestone with scarcely any nesting-material. Another nest had been made far in among tangle and bushes under masses of coarse ivy, forming a jungle. In May, pairs may be seen not having laid yet. The Merganser is a very shy bird, usually taking flight and not diving when a boat is still a long way off. It is most restless, continually in motion either on the water or on the wing. I believe it dives for food only, not to escape from an intruder. On the wing it utters a quack not unlike that of a Wild Duck. Mr. Parker states that within his memory Mergansers have greatly increased on Lough Derg, but that they are rare there in winter. In one instance I saw a pair of

Mergansers on a small lake overlooked from the high road in Co. Sligo. They remained unconcerned when I stopped my car and gazed at them within a hundred yards.

The SMEW has been obtained at Knockdrin, Westmeath, in Mr. Levinge's memory, fully half-a-dozen times. A fine adult male, shot there, is in the Christian Brothers' Museum at Mullingar. A female Smew, shot at Granston Manor, is preserved there, and Lord Castletown says that another was shot there.

The following specimens of marine species obtained on Lough Derg and the Shannon, are in the interesting local collection of Mr. Anthony Parker, at Castle Lough:—A Greenshank, in winter plumage; Great Northern Diver, immature; Razor-bill; Long-tailed Duck, immature; Scaup Duck, Great Black-backed Gull assuming mature plumage; Storm-Petrel (all from Lough Derg), and a Pomatorrhine Skua assuming mature plumage, the two central tail feathers two inches longer than the others, and partly turned on edge, shot on the Shannon above Portumna.

THE EARTHWORMS OF IRELAND.

BY REV. HILDERIC FRIEND, F.L.S.

(Continued from page 241.)

OUR study on the present occasion demands a somewhat detailed treatment, as it is the first time it has ever been attempted in Great Britain. In my last communication to this Magazine, I ventured to treat of those worms whose principal habitat is the trunks of decaying trees, and vegetable debris. I have in the present paper to deal with a totally different genus, whose haunts are aquatic. All those worms which properly come within our purview on the present occasion belong to the genus *Allurus*. There are other semi-aquatic worms in Great Britain, but their affinities with the *Lumbricidæ*, or terrestrial annelids, are remote, and they should be treated rather in connection with the aquatic Oligochaetes, than with the earthworms. There is a wide gulf between the Enchytræids and *Allurus*, though their habitats are very similar.

Allurus, Eisen.

The genus *Allurus* was first created by Eisen in 1873, when he published in the "Ofversigt af Kongl. Vetenskaps Akad." No. 8, p. 43 *et seq.*, a capital summary of the knowledge then existing respecting the Earthworms of Scandinavia. Eisen's one fault lay in placing too much stress on the shape of the lip, too little on internal structure. He was right, however, in separating *Allurus* from *Lumbricus* and *Allolobophora*, for while the latter have the male pore on segment 15, in *Allurus* this important organ falls on the 13th segment—a most valuable and distinctive characteristic. Eisen's summary of the genera may here be profitably reproduced.

A. Setæ ubique binæ approximatae :

I. Tub. ventr. in segm. 14 [= 15 English method] pone segm. buccale.

1. Lob. cephal. postice segm. buccale in duas partes dividens
 *Lumbricus*.

2. Lob. cephal. postice segm. buccale non dividens . . .
Allolobophora.

II. Tub. ventr. in segm. 12 [= 13 English method] pone segm. buccale . . . *Allurus*.

B. Setæ aequo intervallo distantes, exceptis duabus summis, quarum intervallum aliquanto majus est . . . *Dendrobæna*.

Here we find *Allurus* distinguished from its predecessors only by the position of the male pore. The generic diagnosis is brief and simple:—"Tubercula ventralia in segmento 12 [= 13]. Corpus antice cylindricum, postice quadrangulum, setæ binæ approximatae." It was this quadrangular shape of the hinder or tail portion which suggested the name of the genus, and since 1873 there has been no dispute about the nomenclature.

It must not, however, be supposed that the worm or worms included in the genus *Allurus* by Eisen had previously been unknown. We find allusions in the works of several authors in the early part of this century which distinctly point to the species now under review. *Allurus* was unknown to Linnæus. The first writer, so far as I can ascertain, who gives us any information respecting this worm was Savigny, who, discarding the Linnæan term *Lumbricus*, adopted the Græcised word *Enterion* (the Enteron of Aristotle). In Cuvier's "Histoire des Progrès des Sciences Naturelles," he calls it *Enterion tetraëdrum*, or the Square-tailed Worm. Dugès, the same year, gave an account of a worm in the *Annales des Sciences Naturelles*, which he named *Enterion amphibæna*. His reason for adopting the latter or specific name is to be found in the fact that the worm he was describing could go as readily backwards as forwards, after the fashion of the serpent of which Lucanus sang.

Nine years later Dugès wrote again on worms in the same periodical, but put his worm by the side of that of Savigny, and spoke of them as distinct species. He now speaks of them under the term *Lumbricus*, and names them *L. tetraëdrus* and *L. amphibæna*. Of the first he says

that the girdle is composed of seven segments ending with the 28th. The worm is small and fragile, and frequents the neighbourhood of stagnant waters, whence it crawls forth during the night. The second species, he remarks, has a girdle of only six segments, which however ends as before on the 28th. The habitat is the same, but the worm differs from its predecessor, not only in the number of girdle segments, but in its smaller size, the prismatic and crenelated form of the tail, and in the semi-lunar shape of the lip. The colour of the one is a dull brown, while that of the other is violet, with a tendency to iridescence.

These important differences appear to have been ignored by all later writers until the time of Rosa, whose painstaking accuracy cannot be too highly commended. Rosa has not observed the species described by Dugès, but he has the following discriminating observation on the subject.¹

“Il *Lumbricus amphibæna* Dugès, che ha pure orifizi maschili al 13° segmento fu messo come sinonimo del *L. tetraëdrus* dall’ Hoffmeister considrando come anonnale l’allungamento del suo lobo cefalio che taglia interamente il primo segmento. Ciò tuttavia non si può ammettere, avendo il Dugès osservato molti esemplari e conservata la sua asserzione in lavori pubblicati a molli anni di distanza. Io lo considero come una specie distinta di *Allurus* pesche malgrata che il carattere del suo lobo cefalico siasi fin qui riscontrato solo nei. *Lumbricus* ladesinzione che ne dà il Dugès non permette di ravoicinarlo a questogenere; il suo clitello occupa i segmenti, 22-27 (= 6), la coda contratæ prismatic quadrata, il colore violacco mollo iridescente.”

In 1870 Eisen pointed out that the Square-tailed Worm, which he then spoke of as *Lumbricus tetraëdrus* (Savigny) was liable to considerable variations of colour, and he gave names to two of these varieties which are deserving of attention. I believe we have not only the two well-marked varieties *luteus* and *obscurus*, but that some very important facts yet remain to be discovered respecting the causes of variation. Beddard and other investigators have given special attention to the internal anatomy of *Allurus*, and Vejdovsky has described a continental species under the name of *Lumbricus submontanus*, which brings the number of species up to three. I have now to add two others.

A couple of years ago I discovered, on the banks of the Eden, a rich golden-yellow worm in considerable numbers. This worm possessed nearly all the usual characteristics of *Allurus*, but differed somewhat from the type internally. I have only taken it once since, having found a solitary specimen in a little beck at Calverley, near Leeds. This species I have named *Allurus flavus*.

A consignment of earthworms which I recently received from the neighbourhood of Bangor, in North Wales, contained, in addition to more than one species new to the Principality, one which is new to Britain, and probably also to science. I have named it provisionally *Allurus tetragonurus*, the reason for which may at once be assigned. In 1874,

¹ “I Lumbricidi del Piemonte,” p. 52-53. See also “Rev. d. Lumb.”

Dr. Gustaf Eisen published a paper on New England and Canadian Worms, in which he described, among others, a diminutive species from Niagara, which he regarded as the type of a new genus. This genus he named *Tetragonurus*, and supplied the following diagnosis:—

“Body cylindrical in front, quadrangular behind. Male pores on segment 11 [= the 12th segment according to our English mode of reckoning], setæ in approximate pairs. Lip or prostomium not dividing the first ring or peristomium. It comes nearest to the genus *Allurus*, from which it is distinguished, however, by the position of the male pore, which in *Allurus* is on segment 12 [= 13 in English], but in *Tetragonurus* on 11 [= 12], as well as by the lip failing to cut the buccal segment or peristomium.”

Eisen next supplies details of the species (*Tetragonurus pupa*): “Lip or prostomium small, acuminate in front, pallid, not dividing the peristomium. Male pores small but conspicuous. The girdle prominent, usually composed of five segments, viz., 17-21 [= 18-22]. Tubercula pubertatis conspicuous, three on each side of the girdle, occupying the 18th, 19th, and 20th segments [= 19, 20, 21]. About 40 segments in all; length about 25 mm.”

Some Swedish comments on the foregoing description, which is written in Latin, inform us that the puberty band (*tubercula pubertatis*) exists on each side of the girdle in the form of a wart-like protuberance or keel, extending in a continuous line over three consecutive segments. The girdle is well-marked and may be readily distinguished from the other portions of the body. It stretches over five segments, one of which is before and one behind the tubercula. The general colour is sienna-brown, and the worm when alive closely resembles *Allurus* both in general form and in the nature of its habitat.

Thus far I have failed to find any confirmation of Eisen's discovery, and most recent writers drop the genus out of consideration. May not the worm I am about to describe prove to be the identical creature? The Bangor worm is about an inch and a-half long, and has the girdle and tubercula exactly in the position described by Eisen. The girdle is moreover, prominent, and the colour is sienna-brown in front, with a dull yellow-brown tail. The male pores, however, are placed exactly as in *Allurus* on segment 13, and thus prevent us from assigning the worm to the genus *Tetragonurus*.

The question now remains: did Eisen make a mistake respecting the position of the male pore? I dare not insinuate so much, since, next to Rosa, he is the most accurate and painstaking foreign investigator whose works I have consulted. For the present therefore we must assume that there are two worms which are practically identical in every important point, except the position of the male pores. If this is a fact it must have a meaning, and it will be of interest to observe what light future research may be able to throw upon the question.

I have, during the past few years collected and examined many thousands of *Allurus*, and have invariably found them living either actually under water, or in close proximity to it. Bearing on this point I may

adduce the testimony of Mr. Beddard. He remarks—"It is well known that many of the Oligochaeta, which are usually found in ponds and rivers, can also live in damp soil. The *Enchytraëda*, for example, appear to contain quite as many terrestrial as aquatic forms; and even the same species may occur in either habitat. But there are not many instances known of earthworms which lead a partially or entirely aquatic life; indeed the fact that these annelids have been generally supposed to be entirely terrestrial, has been to some extent the cause of their having been distinguished as a separate group of the Oligochaeta—*Oligochaeta Terricolæ*. So far as I am aware there is only one species closely allied to *Lumbricus terrestris*, which has been proved to occur in rivers, as well as in the soil. In a recent number of *Nature*, Mr. Benham noted the occurrence of *Allurus tetraedrus* in England, and stated that his specimens had been collected in a stream. During August of last year (1888), I discovered this worm to be very abundant in the river at Bickleigh, near Plymouth. The river was not at all flooded, and as the worms were tolerably abundant, it seems to me to be fairly certain that they were not accidentally present. Professor Vojdovsky has also recorded the fact that *Allurus* is found in streams in Bohemia, so there can be but little doubt that it is partially aquatic in its habit; it can certainly live equally well in the soil, as I have had the opportunity of examining some examples which Mr. E. B. Poulton was good enough to collect for me in the island of Teneriffe."¹ As we have already noted, Dugès found them near stagnant water in France, and I have found the *A. amphispæna* among the water-weeds which grow in the very centre of the "dykes" of the Sussex marshes.

(TO BE CONTINUED.)

NOTES.

BOTANY.

PHANEROGAMS.

***Eleocharis acicularis*, Sm.**—On a recent ramble with Dr. Scharff between Monasterevan and Portarlinton, on the borders of Queen's Co. and Kildare, I noticed *Eleocharis acicularis* growing in several spots in the Grand Canal. The plant occurs in both counties, and is apparently an addition to the floras of both districts 3 and 5 of "Cybele Hibernica." The form which occurs is not the type, but a curious submerged state, of which I send a notice to the current number of the *Journal of Botany*. The form in question grows completely submerged in 2 to 4 feet of water on the bottom of lakes and canals, which it covers with a short green growth like young grass; I have observed it in Derry, Antrim, and Armagh, as well as in the counties above-mentioned; this aquatic form appears to be invariably barren, and sends up tufts of very slender translucent stems two to four inches in length. I should be glad to know if any of our Irish botanists have noticed this form, of which no mention is made in the text-books.—R. LLOYD PRAEGER.

¹ *Proc. Royal Physical Society, Edin.* vol. x. p. 208.

ZOOLOGY.

SPONGES.

Spongilla fluviatilis in the Barrow.—Mr. Carpenter has handed me over a very fine fresh-water sponge (*Spongilla fluviatilis*, Johnst.) which was sent to him by Mr. T. Greene, of Mageney, Co. Kildare, for the Museum collection. He had obtained it on an old piece of wood in the river Barrow. Three species of fresh-water sponges have been recorded for Ireland, of which *Spongilla lacustris* seems to be the commonest, having been found in the Killarney and Wicklow lakes, and also at Roundstone in Connemara, whilst *Sp. parvifiti* has only been taken in some of the Kerry lakes. *Sp. fluviatilis* although hitherto only recorded from the north of Ireland is likely to be found in other parts as well. It is more hispid than the other species and the pores are larger.—R. F. SCHARFF, Dublin.

INSECTS.

Thera firmata in Co. Dublin.—I was fortunate in taking a specimen of *Thera firmata* here, which Mr. Carpenter, who kindly identified it, informs me has not been previously recorded from Ireland.—GEORGE E. LOW, Dundrum, Co. Dublin.

Corrections.—Mr. H. K. G. Cuthbert writes that the insect taken on the April excursion of the Dublin Naturalists' Field Club, and recorded (p. 173) as *Ammophila sabulosa*, turns out to be a large female *Pompilius fuscus*.

Rev. S. A. Brennan writes that the insects recorded by him, in last month's issue (p. 252), from Cushendun, were not taken there. *Sirex gigas* occurred at Parkmore, Glenariffe, and *Macroglossa stellatarum* at Arboe Rectory, Stewartstown.

MOLLUSCS.

Ianthina rotundata at Portrush.—It may interest some readers of the *Irish Naturalist* to know, that towards the end of last month, this somewhat rare shell was washed ashore in considerable numbers near Portrush; a few were broken, but in nearly every case the shell was perfect, with the animal still living. Some were among seaweed, floated in at the White Rocks, but the greater number along the sands, between the White Rocks and Portrush, where on the 30th of August, a young friend collected upwards of twenty. I found one large specimen in the sands west of the harbour. The species is figured in Sowerby's "Illustrated Index of British Shells." Large numbers of *Verella* were found at the same time and place on the shore.—WILLIAM KENNEDY, Londonderry.

Helix rufescens in Belfast.—W. Thompson states in his "Natural History of Ireland," vol. iv., p. 292, that this species is not found north of Banbridge, Co. Down; and it may be of interest to conchologists in the north to know that this southern shell does occur also in the north of Ireland. The indefatigable collector, Mr. R. Welch, has recently discovered it in the northern suburbs of Belfast, and also at Dunluce Castle, Co. Antrim. Both Mr. Milne and Mr. Standen have also taken it in the Co. Donegal.—R. F. SCHARFF, Dublin.

MAMMALS.

Hairy-armed Bat (*Vesperugo leisleri*) in Co. Dublin.—While shooting in the vicinity of Buckley's Hill, near Carrickmines, I observed a few large bats flying about some trees early in the evening. I procured one specimen which proved to be the above-mentioned species. I mention this, as the locality of this bat might be of interest to our readers.—EDWARD C. BARRINGTON, Dublin.

The Rabbit on the Irish Islands.—Information is wanted by me on the occurrence of the Rabbit on any of the smaller islands surrounding Ireland. I should feel greatly obliged to readers of the *Irish Naturalist*, who possess information on this subject, if they will kindly let me have particulars.—R. F. SCHARFF, 22 Leeson-park, Dublin.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a pair of pigeons from Master F. Kelly, an Ocelot from Dr. Griffin, a pair of Wood Pigeons from Sir A. Weldon, three Japanese Deer and a Sparrow Hawk from Sir Douglas Brooke, a Common Fox from Dr. Stoney, and a Spotted Paradoxure from Dr. R. M. Connolly. A Chimpanzee and two Jerboas have been acquired by purchase.

DUBLIN MICROSCOPICAL CLUB.

JUNE 15th.—The club met at Mr. F. W. MOORE'S, who showed *Stemonitis fusca*, Roth. The specimen was found growing on front of the leaf of a species of *Scheelea* in the large Palm-house at Glasnevin. It covered a space about six inches long by one inch broad, forming a very striking object. This fungus is generally found on dead and decaying material, and it was interesting to now find it growing on part of the leaf of a healthy palm.

MR. GREENWOOD PIM showed *Ustilago receptaculorum* from head of Goatsbeard (*Tragopogon pratensis*) growing at Skerries. This is its first Irish record. The Goatsbeard, though widely distributed is not a common plant, and its smut is decidedly rare. The spores are comparatively large and spinulose. Dr. McWeeney showed these germinated.

DR. M'WEENEY showed a curious example of conjoined parasitism of two minute fungi—*Urocystis anemones*, Sev., and *Peronospora pygmaea*, Ung.—upon the same portion of a leaf of *Anemone nemorosa*. The epidermis, which was slightly swollen and looked bluish from the subjacent spore mass of the *Urocystis*, was covered with a thin bloom, composed of the conidiophorous hyphæ of the *Peronospora*. Sections through the affected part showed an abundance of *Peronospora*-oospores lying amongst the parenchyma cells in close contiguity to the differentiating spore-bags of the *Urocystis*. The mycelium of the two micro-fungi belonging, as they do, to classes widely remote the one from the other, could be seen running side by side between the parenchyma cells; and that of *Peronospora* could be readily distinguished by the paucity or absence of septa, and by its numerous button-shaped haustoria from that of the neighbouring *Urocystis*. On the edge of the sections the gonidial hyphæ of the *Peronospora*, with the simplicity of branching characteristic of the species, could be readily seen, emerging from the stomata, and their continuity with the oospore-bearing hyphæ easily traced. The exhibitor drew special attention to the latter as being objects of rare occurrence in plants gathered so early in the season. The specimen was gathered on the bank of the Aughrim river, on April 5th last.

MR. G. H. CARPENTER showed male specimen of *Plasiocrærus alpinus*, Cb., a spider collected in the Edinburgh district by Mr. W. Evans, and an addition to the British fauna, having been hitherto recorded only from the Alps of Styria and southern France.

MR. MCARDLE exhibited a specimen of the rare *Harpa-lejeunea ovata*, Taylor, which he collected recently in Dunboy wood, Castletownbere, Co. Cork. It has not been previously reported from this locality that we are aware of. The plant is easily known when not in fruit, by the large lobe of the leaf being acutely ovate, and the smaller, or lobule, being saccate and inflated, and by the obcordate underleaves, which are bluntly notched at the apex. This rare species is the only British representative of Dr. Spruce's sub-genus *Harpa-lejeunea*, it is also interesting on account of its geographical distribution, which extends to the Amazon valley and the lower slopes of the Andes in South America.

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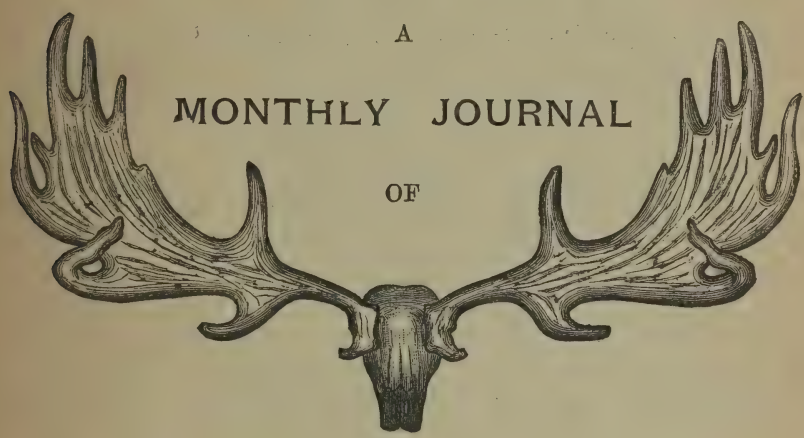
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Fig. 1 (Upper), Caterpillar stretched out like a twig.
Fig. 2 (Lower), Caterpillar bent, as in walking.

CATERPILLAR OF THE SCALLOPED HAZEL MOTH (*Odontopera bidentata*)
ON A ROSE BRANCH.

[Photographed from life by Mr. F. T. Eason.]

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The Irish Naturalist.

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NO. II.

A DECEPTIVE CATERPILLAR.

BY GEORGE H. CARPENTER, B.SC.

ALL persons interested in natural history must be more or less familiar with instances of animals obtaining concealment by means of likeness to their surroundings. No class of facts put forward in support of the theory of natural selection has so impressed the public mind, or taken so large a place in popular scientific literature.

While we admire the perfect protective resemblance exhibited by tropical "walking-sticks" and "leaf-butterflies," it is well to remember that in our own country animals are to be found which show similar resemblances in equal perfection. The white winter coat of our Mountain Hare in its snowy haunts, the mottled plumage of the Grouse on the moor, the russet dress of the Woodcock amid the faded Bracken, and the yellow-spotted skin of our famous Kerry slug (*Geomalacus maculosus*) on the lichen-covered rocks,¹ are instances of such adaptations of animals to their special surroundings. But it is among insects that this question has been more specially studied, and no better examples can be found than the "looping" caterpillars—the larvæ of the great group of moths known to entomologists as Geometers.

If we examine the caterpillar of a butterfly, a hawk-moth, or an owl-moth, we notice, in addition to the three pairs of true legs on the thoracic segments (which correspond to the six legs of the perfect insect), five pairs of "pro-legs" or claspers, situated on the fourth, fifth, sixth, seventh, and tenth (hinder-

¹ Scharff, "The Slugs of Ireland." *Sci. Trans. R.D.S.* (2) vol. iv. pt. x., 1891.

most) segments of the abdomen. But in the "looping" caterpillars, only the pro-legs of the seventh and tenth abdominal segments are evidently present; the three foremost pairs are wanting. These caterpillars, therefore, have six legs just behind the head, and four legs at the tail, the intermediate part of the body being limbless. Hence their peculiar, looping style of walking. The claspers are brought close up to the legs, the insect bending its body into a loop; then the legs are disengaged, and attached at a point in advance, the body being straightened out (Pl. 7, fig. 2). Then, by another loop, the claspers are again brought up. This process can be watched by anyone, in an insect only too common in our gardens—the black and yellow caterpillar of the Magpie Moth (*Abraxas grossulariata*), which often devastates gooseberry and currant bushes.

But the protective resemblance of the looping caterpillars to their surroundings is to be seen when they are at rest. Holding on to the stalk of its food-plant with its claspers, such a caterpillar often stretches its body out, straight and rigid, so that it looks exactly like a twig (Pl. 7, fig. 1). It is not surprising, therefore, to hear that the lady (Miss Stewart-Moore, of Ballylough, Co. Antrim), to whom we are indebted for the specimen figured on Pl. 7, "catching hold of what she took to be the end of the branch, was surprised to find it soft." This particular kind of caterpillar is by no means uncommon, but its remarkable likeness to its surroundings must often cause it to escape observation. The moth to which it belongs is called *Odontopera bidentata*, or the "Scalloped Hazel," a greyish brown insect with deeply dentated wings.

This caterpillar was kept for awhile alive under observation. When disturbed or touched, it would immediately stretch out its body in the attitude shown in fig. 1, and remain for a considerable time quite still and rigid. This position must entail a considerable strain upon the muscles, and seems to be rather ironically called "resting," but immobility is, of course, necessary to the success of the resemblance. The legs, which, if prominent, might betray it to a hungry bird, are pressed close to the underside of the body, and so concealed. This habit, and the wonderful resemblance to which it leads, have long been noted by naturalists. Drawings of various looping caterpillars in this resting attitude may be seen in Prof. Poulton's

recent book on "The Colours of Animals," and the same investigator has more recently published¹ extensive researches on the subject, a summary of which may be found in an article² by the present writer. The particular caterpillar whose portraits are given on Pl. 7, does not, however, seem to have been specially noticed in this connection. The opportunity of photographing a living specimen was, therefore, worth seizing, both on that account, and also for the purpose of directing attention to a fascinating branch of field natural history in which the camera will prove a valuable weapon to the naturalist. For the photographs on Pl. 7, our best thanks are due to Mr. F. T. Eason.

Not only in form, but in colour and markings, does this caterpillar correspond with its surroundings. The greenish-grey lichen, covering the surface of the rose-twigs, is beautifully imitated by the mottled pattern on the insect's back, light greenish patches on a dark background irresistibly suggesting the patches of lichen on the wood. This caterpillar, like many other loopers, is variable, being sometimes dark, and sometimes light or greenish. In Prof. Poulton's memoir, already mentioned, it is shown that the colour of a looping caterpillar often depends upon its surroundings in its early stages. Young caterpillars of *Boarmia repandata* and other geometrid moths reared among dark twigs grew up dark, while those reared among green shoots were light or greenish in hue. The dark colour is due to pigment in the skin; when this pigment is scanty, or absent, the green of the underlying tissue shows through. By a series of beautiful experiments, Prof. Poulton proves that the presence of certain yellow rays of the solar spectrum hinder the formation of the dark pigment. These rays are absorbed by dark objects, but are reflected from green leaves and shoots; and hence comes the wonderful power of the caterpillar to correspond in colour with its environment. This power is, however, lost after the third or fourth moult, for no change could be induced in the insects by altering their surroundings at that stage. It must be remembered that caterpillars do not, as a rule, change their habitat naturally; they are hatched, grow up, and pupate on the same plant. Hence it is enough that they be sensitive in their young stages. There can be no doubt

¹ *Trans. Ent. Soc. Lond.* 1892.

² *Natural Science*, April, 1893.

that the caterpillar of *Odontopera*, which is also sometimes dark, and sometimes greenish (as the specimen photographed) is sensitive in the same way as the insects on which Prof. Poulton experimented.

Besides its protective resemblance, this caterpillar of *Odontopera* has another point of considerable interest. It was mentioned above that in looping caterpillars the three front pairs of claspers are wanting. This is generally the case, but, like most statements about natural objects, some qualification is required. In a few loopers one or two of these pairs of claspers are present in a greatly reduced or vestigial condition, and in *Odontopera* the foremost pair alone is entirely wanting. In fig. 1 one of these vestigial claspers can be clearly seen just beyond the end of the twig to which the insect clings. These reduced organs tell us that this race of caterpillars were not loopers always, but that their ancestral moths had caterpillars with the full number of claspers. It is possible that the twig-imitating habit of the group may have helped the disappearance of the front claspers, which would rather spoil the imitative effect.

It will be remarked that the term "protective resemblance" has been used for the likeness of this caterpillar to a twig. The term "mimicry," sometimes employed in this connection, should be reserved for another kind of imitative appearance, the resemblance of an animal to another animal, which belongs to a different group, and which is protected by some noxious or distasteful character. The likenesses of certain moths and two-winged flies to the stinging bees and wasps are examples of mimicry.

For many years the facts of protective resemblance and mimicry among insects, have been received without doubt as testimonies to the action of natural selection. Lately, however, it has been questioned whether the advantages derived from these likenesses are so great as had been supposed. The accepted interpretation of the phenomena is so natural and beautiful, that it will not be abandoned until a better is forthcoming, which many of us think will never be. But no accepted theories should blind the eyes of the naturalist to the reception of new light. Observations in the field and careful experiments can alone determine what amount of benefit these creatures derive from their deceptive appearance.

NOTES ON THE FLORA OF COUNTY DUBLIN.

BY NATHANIEL COLGAN.

It is now more than a century and a-half since the genial enthusiast, Caleb Threlkeld, laid the foundations of Irish botany in his well-known *Synopsis Stirpium Hibernicarum*, indited, as his preface tells us, in the year 1726 from his house in Mark's-alley, Dublin. Threlkeld's work, while it deals with the flora of Ireland in general, has special reference to the native plants of the environs of Dublin, and giving, as it does, definite localities in the neighbourhood of the city for some 140 species of phanerogams and ferns, may fairly be regarded as a first essay at a County Dublin Flora. From Threlkeld's time onwards, the plants of the county have engaged the attention of a series of botanists, professional and *dilletante*. As the seat of the University, the Royal Dublin Society, and the Medical Schools, the Irish capital became naturally the chief centre of Irish botanical science, and the surrounding country the favourite field for its practical study; so that as regards the more immediate surroundings of the city, perhaps no district in Ireland has had its flora more thoroughly explored. But from the very nature of the case this exploration was anything but systematic; and the only serious attempt at a painstaking botanical survey of the county, that carried out by Dr. Walter Wade towards the close of last century,¹ is in many points incomplete. Most of all is it defective in the study of distribution. Large tracts of the county, in fact, were never examined by Wade, and consequently little reliance can be placed upon his determination of comparative rarity or abundance of species. With all its shortcomings, however, Wade's Catalogue of Native Plants of the County of Dublin is a meritorious work. In one respect especially, is the author deserving of unstinted praise—he has made it a point to see for himself every species he records. All through his catalogue he makes *inveni* take the place of

¹ *Catalogus systematicus Plantarum Indigenarum in Comitatu Dublinensi Inventarum*—Dublin, 1794. In a rapid survey of the botanical literature for the county Dr. Rutty's *Natural History of the County of Dublin* (1772) scarcely deserves mention. His chapters on plants are little more than a treatise on medical and economic botany.

the impersonal and irresponsible *habitat*, and thus makes himself answerable for every species and every station recorded. Some rigid critics may be inclined to hold that Wade has much to answer for. In several instances, no doubt, he has found what no other botanist has found after him ; in a few, he has recorded what there is strong reason to believe never grew in the county. But it is very easy from the height of our modern advantages to look down with too censorious eyes on the labours of the earlier botanists.

After Wade's Catalogue, which excluded the sedges and ferns, deferred to a Second Part, never published, no fresh attempt at a Co. Dublin Flora was made. Wade himself gave many new localities for the county in his *Plantae Rariores* (1804). In Mackay's Catalogues of Irish Plants (1806-25) ; in the *Irish Flora* of Lady Kane (1833) ; the *Flora Hibernica* of Mackay (1836) ; the *Cybele Hibernica* of Moore and More (1866), and the *British Association Guide to the County Dublin* (1878), many others were added ; and, finally, in Mr. H. C. Hart's *Flora of Howth* (1887), a section of the county and, perhaps, the richest of all, had its botany worked out in detail. To this last work an appendix of Co. Dublin plants found outside the Howth peninsula was added, sufficiently full to enable the student to make a rough estimate of the extent, in species, of the local county flora.

It will thus be seen that for many years much scattered material had existed with which the foundations, at least, of an exhaustive Co. Dublin Flora might be laid. But, so far, no one had been tempted to utilize this material for such a purpose when some eighteen months ago it occurred to me that a systematic botanical survey of the entire county was for many reasons a task worth undertaking. The work was accordingly begun without delay, as soon, in fact, as I had laid down on the one-inch Ordnance maps the artificial divisions of the field of inquiry indispensable for the proper study of distribution. Such a survey, as every practical botanist well knows, is necessarily a tedious one if done at all thoroughly ; yet the steady devotion to the work of the leisure moments of the past two seasons has already accomplished this much—it has enabled me to form a just estimate of the distribution of a majority of the Co. Dublin species, and to collect a considerable mass of evidence bearing on the difficult problem of the relations between plants and soils.

Many of the results arrived at, up to the present, whatever their value may be, are necessarily in the nature of dry detail. Some, however, are likely to be read with interest by all who have any practical acquaintance with the county flora, and a short selection from these I now propose to give here, embodying with these more recent observations, a few of the results of many previous years of desultory botanizing in the more picturesque southern or mountain districts of the county. These notes may be conveniently arranged under three classes:—

I. Plants not previously recorded for the county; II. Recent observations of rarer species recorded only by the earlier writers; and III. Rarer Co. Dublin species found in new stations.¹

I.—PLANTS NOT PREVIOUSLY RECORDED FOR CO. DUBLIN.

Hieracium umbellatum, Linn.—Left bank of the Glencullen river in considerable quantity, below the bridge on granite rocks and about half a mile above it on open field-banks. Previously known in many stations in the Co. Wicklow. The Hawkweed flora of the Co. Dublin is extremely limited; in addition to this species and the ubiquitous *H. pilosella*, it includes only one other species, *H. vulgatum* (Fries) found on the Liffey above Leixlip by Mr. A. G. More (*Cyb. Hib.* p. 175).—N. C.

Orobanche minor, Sutt.—In abundance, on *Trifolium pratense*, in Shennick's Island, Skerries, where it was found and pointed out to me by my brother, Rev. Wm. Colgan, in July, 1893. I am not aware of any previous record for the county.

Utricularia neglecta, Lehm.—(1) Quarry hole by the Ward River below Chapelmidway and (2) pools in the Bog of the Ring near Balrothery (Balbriggan) July, 1893. Mr. Arthur Bennett has kindly cleared up my doubts as to the identity of this plant. Added to the Irish Flora by Mr. R. W. Scully from Kerry in 1887.—N. C.

Carex teretiuscula, Good.—By the Royal Canal above Clonsilla, sparingly, July, 1893; probably carried down by the canal from the inland bogs.—N. C.

Eleocharis acicularis, (Sm.)—Along the Grand Canal from Hazel-hatch to Clondalkin, in great abundance, September 30, 1893. Growing in from 3 to 18 inches of water, the abortive spikes conspicuously floating on the surface in the shallower situations. Previously found by Mr. R. L. Praeger higher up the same canal in Queen's Co. and Co. Kildare (see *Ir. Nat.* Oct. 1893). The Co. Dublin plant in some of my specimens is fully 9½ inches long and is obviously the recognised deep-water form mentioned in Babington's "Manual" (8th Ed. p. 390). In seasons of average rainfall the plant will, no doubt, be found totally submerged in the canal.—N. C.

To these additions, as I believe them to be, to the county flora may be added the two following, hitherto unpublished,

¹ In the following notes my own observations are distinguished by the initials N. C.

and due to the researches of my friends, Rev. C. F. d'Arcy and Mr. R. W. Scully.

Scutellaria galericulata, Linn.—Found by the Royal Canal below Lucan station, sparingly, *circa* 1887, by Mr. R. W. Scully, who has shown me specimens from this locality. I am on the whole inclined to agree with H. C. Hart in holding that Wade's record for this species: "In the marshes of Howth" (*Pl. Rar.* 1804) should be transferred to *S. minor* which I have gathered fully twelve years ago on Howth Head in one of the stations given by Mr. Hart. If this revision of Wade's record be correct, Mr. Scully's station becomes the first county record for *S. galericulata*.

Polypodium Phegopteris, Linn.—Found on damp shaded rocks on Secawn mountain, Glenasmole, *circa* 1883, by Rev. C. F. d'Arcy, who soon afterwards showed me the plants growing there. Perhaps this species and *Osmunda regalis*, recorded from Howth by Mr. H. C. Hart, are now amongst the rarest of the Co. Dublin ferns.

II.—RECENT OBSERVATIONS OF RARER SPECIES RECORDED ONLY BY THE EARLIER WRITERS.

Corydalis claviculata, DC.—On a granite *talus* in Glenamuck near the Scalp, 1882. This is the only Co. Dublin station in which I have seen the plant, and I can find no other county records more recent than those in *Flora Hibernica* (1836).—N. C.

Bidens cernua, Linn.—Abundant in the Bog of the Ring south of Balrothery (Balbriggan) July, 1893.—N. C.

B. tripartita, Linn.—Abundant at the pond near Balrothery known as the Lough or Knock pond, July, 1893. The pond had become very much reduced in size by the extreme dryness of the year, and the *Bidens* appeared growing in a stunted form stranded many yards from the water's edge. So far, I have found this and the preceding species only in the stations here given, and though both appear to be very rare in the county, I can find no definite localities for either later than Wade's (1794).

Lysimachia vulgaris, Linn.—In small quantity in an old quarry by the Delvin river nearly opposite Stamullen in the extreme north of the county, July, 1893. Hitherto this species could only claim a place in the Dublin flora on the faith of the old record: "about Loughlinstown and Old Connaught" in the *Irish Flora* (1833). In this station it has not, I believe, been seen for very many years.—N. C.

Ruppia spiralis, Hartm.—Tidal river-reaches near the head of the Malahide estuary, abundantly, in two stations (1) near Lissen Hall at the mouth of the Broad Meadow Water, and again (2) about a mile to the eastward near Newport House, July, 1893. These appear to be the first definite localities for this plant in the county, the only previous mention I can find of it being the reference in *Cyb. Hib.* (p. 316) to a specimen labelled in Dr. Mackay's Herbarium "near Dublin, &c."—N. C.

Hydrocharis Morsus-ranae, Linn.—This species, now very rare in the county, though probably much more plentiful before the low-lying bogs were drained, I found in three stations in July, 1893: (1) the Bog of the Ring, (2) Curragha Bog, and (3) the Broad Meadow Water near the old church of Killossory. In the first two stations it grows in abundance, but only very sparingly in the third. As regards station 2, given in Wade's *Plantae Rariores* (1804), the difficulty is rather to find the bog than the plant; for drainage has reduced this favourite hunting-ground of the earlier botanists to one deep pool about 50 feet long by 15 wide and a couple of ditches adjoining.

Both pool and ditches, however, still nourish abundance of this interesting species. This station very narrowly escapes being in the Co. Meath, but careful study of the map and the aid of an intelligent resident farmer, who traced out for me the actual county boundary, set it beyond all doubt that this last remnant of the Curragha¹ Bog is in the Co. Dublin.—N. C.

Malaxis paludosa, Sw.—On Glendhu mountain in considerable quantity, growing on a level stretch of living *Sphagnum* at a height of about 1,500 feet, July, 1884; the only station in which I have found it in the county. Mr. John Bain, the veteran of Irish botanists, assured me in March last that he had gathered *Malaxis* in great abundance at the head of Kelly's Glen² both before and after the publication of the *Flora Hibernica* (1836). The plant does not appear to have been observed there recently. So well does its small size and quasi-protective colouring enable *Malaxis* to elude discovery that I have met with more than one botanist of wide experience who has never had the good fortune to see the plant growing.—N. C.

Hymenophyllum Wilsoni, Hook.—Sparingly on one of the upper forks of the Dodder River, Glenasmole, where it was pointed out to me by Rev. C. F. d'Arcy in 1883. This seems to be the locality set down, in error, no doubt, in the *Irish Flora* (1833) for *H. Tunbridgensis*.

III.—RARER CO. DUBLIN SPECIES OBSERVED IN NEW STATIONS.

Nasturtium palustre, DC.—(1) The Lough, Balrothery, (2) Bog of the Ring, (3) near Baldwinstown cross-roads, and (4) north of Lusk, July, 1893 (for all stations).—N. C.

Senebiera didyma, Persoon—Roadside at Kilmacud about one mile west of Stillorgan, but not abundantly, October, 1892. Very rare in the county.—N. C.

Hypericum hirsutum, Linn.—Hedgerows near Drimnagh, a few plants, September, 1892.—N. C.

Trifolium fragiferum, Linn.—(1) Shore south of Raheny, abundantly, 1892; (2) marshy hollows by the Grand Canal, Hazelhatch, 1893, and (3) by the River Tolka, near Mulhuddart, 1893. The inland stations 2 and 3, distant respectively twelve and eight miles from the nearest sea, are interesting from their position, as the species, in Ireland, at least, appears to have a decided preference for the coast.—N. C.

***Linaria minor**, Desf.—Abundantly along the railway line from Clontra to Bray river, September, 1893. Also noted this year by Mr. R. Ll. Praeger in abundance along the railway at Foxrock. A species which spreads very rapidly along railways, growing by preference in the ballast.—N. C.

†**Chenopodium rubrum**, Linn.—(1) Wet ground by the Ward River near Chapelmidway, July, 1893, (2) banks of the Grand Canal at Hazelhatch, September, 1893, and (3) by the watercourse connecting the upper and lower ponds of Brittas, October, 1893. Well established in all three stations; certainly introduced by traffic in (2); probably a farmyard outcast in (1); and most remote from dwellings in (3). Very rare in the county.—N. C.

¹ Pronounced Curragh-ha by the peasantry of the district.

² The Upper Dodder valley, now, and, as I believe, always known to the inhabitants as Glenasmole. I have many times inquired for Kelly's Glen from natives, young and old, of the Upper Dodder valley, and have been invariably referred to the valley lying some three miles farther to the N. E. between the Kilmashogue and Tibbradden mountains.—N. C.

Lemna gibba, Linn.—Very abundant in a pond near Ballisk, Donabate, July, 1893. The only other record for the county seems to be: "Pond near Glasnevin, D. M.," *Cyb. Hib.* (1866).—N. C.

Carex strigosa, Huds.—(1) Hedgerows near Drimnagh and (2) near Kilsallaghan, 1893. One of the rarest sedges of the county.—N. C.

Equisetum Wilsoni, Newm.—On the Dodder River near Bohernabreena and at Rathfarnham, 1893. Still very abundant in its old station along the Royal Canal, above and below Clonsilla.—N. C.

In concluding these brief notes I desire to express my best thanks to my friend, Mr. A. G. More, for the valuable counsel and assistance he has given me in many way in the prosecution of my researches, and to Mr. Arthur Bennett for his kindness in determining for me some critical plants collected in the county.¹

THE EARTHWORMS OF IRELAND.

BY REV. HILDERIC FRIEND, F.L.S.

(Concluded from page 276.)

Allurus, Eisen.

The lip or prostomium either slightly attached, or cutting more or less deeply into the peristomium, or buccal segment. Setæ in four couples, occupying the four angles of the body posteriorly. Girdle of five or more segments, commencing on the 18th or some more posterior segment. Tubercula pubertatis on three consecutive girdle segments. Male or spermiducal pores on segment 13, and thus in front of the oviducal pores, usually on papillæ, lateral in position. Spermatophores attached ventrally between male pores and girdle. Body cylindrical in front, quadrangular behind. Notwithstanding Beddard's able diagnosis² the internal characters of the whole genus need revision. Owing to the paucity of materials I have as yet been unable to dissect the recently discovered species, but their external characters will amply suffice for identification.

¹ I shall be glad to correspond with any reader of the *Irish Naturalist* who may be able to supply me with further new stations for any of the foregoing or other of the rarer species of the county. All communications on the subject addressed to me to 1 Belgrave-road, Rathmines, Co. Dublin, will be thankfully acknowledged.—N. C.

² *Q. J. M. Sc.*, 1888, vol. vi., pt. ii., pp. 365-71.

SPECIFIC CHARACTERS.

1.—*Allurus tetraëdrus*, Savigny—A small worm, seldom reaching two inches in length, usually about one to one and a-half inches when crawling about, but able to stretch to two or even three inches in the case of the largest specimens. Body somewhat cylindrical before, four-angled behind the girdle, which is prominent, and closely fused. It often appears to encircle the whole body, is lighter in colour, and normally extends from the 22nd to the 27th segment. A glandular ridge connects the girdle with the male pores on the 13th segment. These latter pores are well seen, being seated on somewhat conspicuous papillæ. The oviducal pores are on segment 14, thus being behind the male pores, while in *Lumbricus* they are in front. Dorsal pores commence between the 4th and 5th segments. In addition to the ordinary setæ, situated at the angles of the body, there are rod-shaped bristles on the segments which contain the essential organs, as well as minute claw-like setæ or spines scattered over the body. The ordinary setæ carry some minute projections on the extremity which projects outwards, while the internal extremity is attached to its sac by a congeries of fine muscular threads. The tubercula pubertatis form a band on either side the girdle, and occupy segments 23, 24, 25, or in some cases segments 23 to 26 inclusive. This point needs fuller investigation. I have found both arrangements, but am at present unable to say whether there is specific difference between the two forms.

The colour varies considerably, on which account Eisen has distinguished a type and varieties. The type is usually sienna brown, darker in front, with lighter girdle, and the tail often of a fleshy brown, or tending to green. It undoubtedly simulates the colour of its surroundings, or is able to bring about a close resemblance between its body-colour and the colour of the soil or vegetation amid which it resides. The worm is exceedingly active, and is able to move rapidly backwards, a mode of locomotion which it seems to prefer to direct progression. I have not found allusion in any writer to the spermatophores which the animal carries about during the breeding season. I have found them repeatedly affixed to the ventral surface, usually about segments 19 or 20. Internally I find spermathecæ in segments 9 and 10, and the crop and gizzard as in *Lumbricus*. In this I differ from Beddard, whose Teneriffe species comes nearer to the third British species mentioned below. Total number of segments—60 to 90, or about twice as many behind the girdle as before it.

The egg-capsules of this worm are to be found in great abundance at almost every season of the year. They are small, and of an olive-green colour. The young seem to reach an adult condition very early, and this fact, together with the power to go rapidly backwards, and the almost complete encirclement of the body by the girdle, seems to point to a primitive type, and indicate that *Allurus* is a surviving link by which to connect our earthworms with their progenitors of aquatic habit.

The synonyms are numerous.

- 1829. *Enterion tetraëdrum*, Savigny, "Histoire des Progrès des Sciences Naturelles" (Cuvier), ser. II, vol. iv., p. 17.
- 1837. *Lumbricus tetraëdrus*, Dugès, *Annales des Sciences Nat.* ser. II., vol. viii., pp. 17-23.
- 1843. *Lumbricus agilis*, Hoffmeister, *Wiegmann's Archiv. für Naturgeschichte*, p. 191, Tab. ix., fig. 6; also "Familie der Regenwürmer," 1845, p. 36, fig. 8.
- 1851. *Lumbricus tetraëdrus*, Grube, "Die Familien der Anneliden," pp. 99, 145.
- 1861. *Lumbricus tetraëdrus*, Johnston, "A Catalogue of British Worms," p. 61.
- 1870. *Lumbricus tetraëdrus*, Eisen, *Ofversigt af K. Vetensk.-Akad.*, p. 996-7.
- 1873. *Allurus tetraëdrus*, Eisen, *Ofversigt af K. V.-Akad.*, No. 8, p. 54.
- 1884. *Allurus tetraëdrus*, Rosa, "I Lumbricidi del Piemonte," p. 51.

The distribution appears not to be limited to Europe. I have records for Hungary (Ærley, A Magyar. Olig. Faunaja, 1880), France, Italy, Teneriffe, Germany, Bohemia, Scandinavia, England, Valparaiso, etc. Mr. Beddard says: "*Allurus tetraëdrus* must be regarded as a rather uncertain North American form. I have included it in the list (of Nearctic worms) on the strength of a specimen kindly sent to me some time since by Mr. Tyrrell, of the Canadian Geological Survey. I examined this specimen by means of longitudinal sections, and identified it with *Allurus* on account of the structure of the gizzard."¹ In Britain it is ubiquitous. I have found it in, or received it from Sussex, Kent, Essex, Suffolk, Devonshire, Gloucestershire, Yorkshire, Lancashire, Wales, Ireland, Scotland, and elsewhere. It may almost without exception be found wherever water occurs—by ditches, ponds, streams, rivers, and lakes, usually in considerable numbers. The soil, however, has some influence on the worm; clay and iron are eschewed.

Respecting the varieties which exist it is at present difficult to speak with certainty. Eisen gives two, which Ærley includes in his Hungarian list, and I have found others which will merit attention when the subject has been more fully worked. Colour alone is not a sufficient test, and we do not know how far the girdle and *tubercula pubertatis* may be liable to variation without affecting the species.

1. *A. tetraëdrus*, var. *luteus*, Eisen—Body sienna-brown, yellow ventrally. Girdle warm yellow or pale cinnabar-red. I find this variety chiefly in sandy or gravelly beds, somewhat widely distributed.

2. *A. tetraëdrus*, var. *obscurus*, Eisen—Body grey-brown, with pale ventral surface. Girdle of the same colour as the rest of the body, or somewhat lighter. Seems to prefer roots of grass by the sides of streams and ditches in meadow or pasture land. It is as common as the type, and may owe its colour simply to its environment. In this case we have an interesting question yet to solve. What can be the value to the worm of this mimicry?

DISTRIBUTION IN IRELAND.—Malahide, Co. Dublin (Mr. Trumbull); Cashed, Tipperary (Lt.-Col. Kelsall); Carrablagh, Co. Donegal (Mr. Hart).

[2. *Allurus amphibiaena*, Dugès—Though the majority of writers have confused this species with the last, Rosa and Eisen have already pointed out the fact that the characters are widely different. I had also come to the same conclusion long before seeing the remarks of these careful investigators. Dugès first described the worm in 1828 under the title *Enterion amphibiaena*. His reason for adopting the latter name is to be found in the fact that this worm (like the one already described, and, in a lesser degree, *Lumbricus purpureus*, Eisen) can go as readily backwards as forwards, after the fashion of the serpent of which Lucanus sang. Nine years later (in 1837) Dugès returned to the same subject, and he now affirms that his worm is quite distinct from that of Savigny. He therefore named the one *Lumbricus tetraëdrus* and the other *Lumbricus amphibiaena*, and gave a clear diagnosis of each. *A. amphibiaena* differs from the other in the following particulars:—There are fewer girdle segments, the colour, size, and shape differ, and, above all, the insertion of the lip into the peristomium is quite dissimilar. If Eisen's diagnosis were pressed we should have to put this worm with the genus *Lumbricus*; but, just as one of the *Dendrobænae* has the head of a *Lumbricus*, with all the other characters of an *Allolobophora*, so this worm has all the characters of an *Allurus*, with the head of a *Lumbricus*, Eisen's lip and peristomium arrangement, therefore, falls through. *A. amphibiaena*, Dugès, is a small worm, with a crenulated tail, which is prismatic when contracted, and the body colour is violet, with iridescence. The girdle occupies segments 23 to 28 (or 22-27), and the lip forms a perfect mortise and tenon with the

¹ "Proc. Roy. Phy. Soc., Ed., 1891. Q. J. M. Sc., vol. vi., pt. II., p. 365 (1888).

prostomium. Dugès examined many specimens, and persisted in the assertion that the worms differed specifically. I have found specimens in the south of England which correspond almost exactly with Dugès' description. Rosa does not record it for Italy, nor Eisen for Scandinavia, and we need further light on the subject. It has not reached me from Ireland, but is included here to make the study of the genus complete.

Respecting the synonymy, the only confusion that exists has arisen from the tendency of authors to identify this species with the foregoing. Henceforth they must be kept distinct.]

[3. **Allurus flavus**, Friend—In 1890 I found a species of *Allurus* in the bed of the River Eden, about two miles west of Carlisle, which differed in several particulars from either of the foregoing. I gave a brief description of it at the time; then regarding it as corresponding with *A. tetraedrus*, var. *luteus* of Eisen. Fuller investigation has led me to conclude that it is a new species. I found one solitary example in 1891 in the bed of a small stream at Calverley, near Leeds, since which time I have not observed another living example among all the thousands of specimens which have passed through my hands. When the opportunity recurs for me to examine living material I shall be able to speak with greater certainty respecting the specific differences, as my knowledge of the group has greatly developed during the past two years. There are certainly internal differences, and I am disposed to think the Tenerife examples examined by Mr. Beddard come very near or belong directly to this species. *A. flavus*, Friend, is of a rich yellow or gold colour throughout, nearly transparent, so that the blood-vessels can be clearly seen. Lip very palid; girdle orange-coloured, usually on segments 23-26, with a band (*tubercula pubertatis*) on 23, 24, 25. The tail is often more cylindrical in shape than in the foregoing species, and it is usually a good deal smaller than the type, though possessing a similar number of segments. Hitherto it has been found only in the localities named, and it is without synonyms, so far as I am aware.]

[4. **Allurus tetragonurus**, Friend—As already stated, this worm has recently reached me from Bangor, N. Wales. It is about an inch to an inch and a-half in length, but a good deal wider in proportion to its length than any other species yet examined. The lip is pallid, and does not cut deeply into the first segment or peristomium. The male pores on the 13th segment are small, but clearly discernible. The girdle is very prominent and closely fused; it extends from the 18th to the 22nd segment, and surrounds the entire body—not after the fashion of *Perichata*, but as is frequently the case with *A. tetraedrus*, Savigny. The *tubercula pubertatis* form a distinct band on either side of the middlemost girdle segments 19, 20, 21. The total number of segments is from 80 to 90, and these diminish in size from the girdle in either direction. Excepting near the anal extremity, a section taken through the worm's body would in no case be quadrangular, as in the case of the type. At least one-half of the body has an oval contour, somewhat flattened on the under surface. The head is warm-brown, the girdle yellow-brown, and the hinder part light sienna-brown. In colour, therefore, it resembles var. *luteus*, Eisen. Owing to lack of suitable material, I am at present unable to report on the internal structure. Unless this worm should prove to be identical with *Tetragonurus pupa*, Eisen, it is at present without synonyms, and Bangor is the only known locality.]

5. **Allurus macrurus**, Friend—Among a very valuable series of worms sent to me by J. Trumbull, Esq., L.R.C.S., from Malahide on November 22nd, 1892, I found a single specimen of an *Allurus* which is totally different from any British species yet described; and as it is also, so far as I am able at present to determine, distinct from every other species known to science, I send this preliminary note respecting it. Fuller details must be reserved till a further supply of material can be obtained.

The Long-tailed Allurus (*A. macrurus*, Friend), when preserved in alcohol is 3 cm., or nearly an inch and a-half in length, and 5 millimetres in diameter across the girdle. In this brief space we find no fewer than 160 segments, those behind the girdle being the narrowest I have ever seen in any earthworm at home or abroad. Like its nearest ally (*A. tetragonurus*, Friend), it has the girdle in a very advanced position, apparently covering segments 15 to 22. The clitellar papillæ (*tubercula pubertatis*) are on the underside of the girdle-segments 20, 21. On segments 13 and 22 we find ventral papillæ of a peculiar character, arranged in twins. The head is fleshy pink, the body of a peculiar greenish hue, quite different from any other species known to me. The girdle is yellowish, and retains a somewhat yellow-green hue in spirits. The setæ are wide apart, and the anus is peculiar in shape, size, and general appearance. The enormous number of segments behind the girdle (viz., 140) has suggested the name *macrurus* or the Long-tailed Worm, and the presence of the male pores on segment 13 determine its position in the family.

We now have five species of *Allurus* in Great Britain, each one of which, however, merits a good deal of further investigation. Of the life history, distribution, affinities, varietal forms, range of habitat, and other matters we at present know very little, and I shall welcome any assistance from collectors in Ireland which will make this subject better known. The West of Ireland should yield one or two more species if carefully worked.

A summary of the genus may fitly bring this memoir to a close.

TABLE OF THE GENUS ALLURUS.

Allurus.	Segments occupied by:		Length.	Shape.	Colour.	Prostomium.
	Male Pore.	Girdle				
1. tetraedrus , Savigny, 1828.	13	22-27.	2-in.	Cylindrical before, Quadrangular behind.	Sienna Brown.	Partially cutting peristomium.
2. amphisbaena , Dugès, 1828	13	23-28	1½-in.	Crenulated prismatic.	Violet, iridescent.	Entirely bisecting peristomium.
3. flavus , Friend, 1890	13	23-26	1½-in.	Cylindrical to quadrangular.	Golden yellow.	Slightly cutting peristomium.
4. tetragonurus , Friend, 1892	13	18-22	1½-in.	Oval before, wide in proportion.	Dark to yellow brown.	Partially cutting peristomium
5. macrurus , Fr. 1893	13	15-22	1½-in.	Much wider in front than behind.	Pink head, greenish body.	Not cutting peristomium.

AMERICAN BIRD-VISITORS TO IRELAND AT HOME.

BY W. E. PRAEGER, OF KEOKUK, IOWA.

IV. THE BELTED KINGFISHER (*Ceryle alcyon*).

THE only instances of this bird's occurrence on the eastern shores of the Atlantic are the two well-authenticated Irish records. One specimen was shot in Co. Meath, on the 26th October, 1844, and another in Co. Wicklow in November of the same year. The skins are still preserved, one in Trinity College, and the other in the Science and Art Museum, Dublin.

It is remarkable that in a continent as well supplied with rivers and lakes as temperate N. America, there should be only one kind of Kingfisher. But the western world, as a whole, is poor in Kingfishers, only having six or eight species, all belonging to a single genus, or only about five per cent. of the known species. It is probable that Kingfishers are a very recent introduction, and in those portions of the continent where the water is frozen in winter, and for some distance south of that line, the extensive migration has encouraged interbreeding, so that in all the vast area this includes—a territory probably better supplied with fresh water than any other of similar area on the globe—only one species of Kingfisher exists to-day. All other American species are inhabitants of the tropical or sub-tropical regions of the continent, where, being residents, the development of a number of local races and species has taken place.

But what our country may lack in variety of species, it makes up in number of individuals. All through the continent, from the Atlantic to the Pacific, and from the Arctic Ocean to Panama and the West Indies, the Belted Kingfisher is a common bird. It is resident wherever it can be, but is driven out of the northern portions of its range by the freezing of the waters; yet if it can only find open water, it will stay all the winter, no matter how cold the weather may become, and records of its remaining near warm springs or salt water through intensely cold winters are not uncommon. It moves north early, following the melting of the ice, and before our ears have grown accustomed to the unwonted sounds of waves and running waters, the loud laugh of the Kingfisher comes as their natural accompaniment.

The Kingfisher is a solitary bird, and except in the breeding season, two are rarely seen together, unless fishing-grounds are scarce. Soon after their arrival each pair selects a suitable nesting-site and fishing-ground, from both of which all intruders are kept away. River-men say that the whole length of the Mississippi, with all its bays and creeks, is thus divided among the Kingfishers, each pair having its own territory. The nesting-site is some bank of sand or clay, usually but not always above water; there a hole is dug from four to eight, or even fifteen feet in depth, and the eggs deposited in a chamber at the farther end. No nest is built, but the hole is often lined with fish-bones mingled with other refuse of the bird's food. The eggs are usually six in number, pure glossy white, and measure about 1.35 by 1.05. The Kingfisher varies his usual diet of fish with an occasional lizard, small snake, crab, craw-fish, or mouse; the indigestible portions of his food are cast up in the form of pellets, after the manner of the birds of prey.

When a Belted Kingfisher is in the neighbourhood, the most careless observer is sure to notice him. His note, frequently sounded, is a loud rattling laugh. He is a large bird, and chooses the most conspicuous places for perching, where his great bill and bushy crest make him recognisable as far as seen. The Irishman, accustomed to the little jewelled darling of his own hill-streams, would call him a "coarse lump of a bird." He is over a foot long, and about two feet in expanse of wing. The wings and tail are both proportionately longer than in the genus *Alcedo*, to which the Irish Kingfisher belongs.

The general colour of the upper parts of the Belted Kingfisher is slaty-blue, and of the under parts white; the wings are spotted, and the tail barred with white. The female has the breast-band shaded with chestnut, and is chestnut on the belly and flanks; young birds resemble the female.

While the Belted Kingfisher is found in a variety of surroundings, wherever in fact there is water from which he may obtain his food, and while I have seen him in just such quiet nooks as the Irish Kingfisher loves to haunt, yet he is chiefly associated in my mind with very different scenes. It is the 1st of September, the breeding season is over, and the first migrants are already here from the north. The collector

takes down his gun, which for over three months has been idle, and again visits his favourite hunting-ground. The great river has been shrinking all through the hot summer, and is now a paltry stream less than half a mile wide, and leaving wide stretches of sand, where waters were deep in the fresh spring-time, and where now the islands with their luxuriant foliage appear as oases in a desert. Here and there, pools of water are left, and the same eddy of the great river that hollowed out the sandy bottom has undermined the bank, and several large trees lie in a tangled mass in and above the pool. On the topmost of the dead branches the bird well called Kingfisher sits, and rattles loudly as the collector tries vainly to approach unobserved the likely spot. A big heron rises, wariest of birds, rarely giving a chance for a shot. Soon he is followed by a beautiful Wood-duck; several small Green Herons wait a little longer among the branches, but finally follow their big brother; a pair of Solitary Sandpipers spread their long wings, and lightly cross the pond, and from the farther side watch the stranger, solemnly jerking their heads the while. Soon they are followed by several little Spotted Sandpipers that run backwards and forwards on the edge of the pool, or along the logs, incessantly jerking their tails. A Woodpecker, that was making a good breakfast by scaling off the dead bark, utters a sharp note of alarm as he flies off, while several little turtles that have been basking on the logs, fall with a loud "k-plunk" into the water, and a black-and-white water-snake glides noiselessly in with them. But still the Kingfisher holds his position of command, flying from one post of observation to another, or at times poising almost stationary in the air with rapidly beating wings, and uttering his rattling note of indignation and defiance. How shall we close the scene? He is easily within shot, and a beautiful bird, an ornament to any cabinet. But let us be better than mere collectors this morning. To the ornithologist, eyes and note-book are better tools than gun and scalpel. Let us look our fill, and then leave him and his companions of the lonely pool, and trudge homeward over the hot sand, with game-bag empty perhaps, but with mind and heart full of the beauties and wonders of creation.

OBITUARY.

REV. GEORGE ROBINSON, M.A.

The Rev. George Robinson, M.A., died at his residence, Beech Hill, Armagh, on September 5th, at the age of 72. After obtaining his degree and Divinity Testimonium in Trinity College, Dublin, he took holy orders as curate of Tullyniskin, and was shortly afterwards appointed rector of the important parish of Tartaraghan, in the Co. Armagh. He held this post for thirty-three years, but a severe illness compelled him, in 1882, to resign his office. Mr. Robinson was from early years devoted to natural history, and especially to ornithology and botany. In both these departments he added considerably to the Armagh lists. He contributed important notes to Thompson's "Birds of Ireland," "Cybele Hibernica," and Stewart and Corry's "Flora of the N.E. of Ireland." Among the birds he noted the occurrence of the Brambling (*Fringilla montifringilla*, L.) and the Yellow Wagtail (*Motacilla raii*, Bonaparte), in Co. Armagh; and among plants he found many species of rare occurrence, notably *Mercurialis perennis*, *Stachys betonica*, *Lathyrus palustris*, *Carex pseudo-cyperus*, *Calamagrostis stricta*, etc.

Mr. Robinson was a member of the British Association for the Advancement of Science, and regularly attended its meetings; also of the Belfast Naturalists' Field Club, at the excursions and meetings of which he was a frequent attendant. Of the Armagh Natural History and Philosophical Society he was an original member, having belonged to the old Society which preceded the present one. He took a prominent part in establishing the Society on its present basis, taking the greatest interest in its success.

On the late Bishop of Down (Dr. Reeves) resigning the office of President in 1879, Mr. Robinson was unanimously elected to fill the vacancy, and held the post till 1891, when owing to failing health he was obliged to resign. He strove during his presidency to promote the objects of the Society by offering prizes and by obtaining lecturers.

It is much to be regretted that Mr. Robinson never published any papers on the natural history of Co. Armagh, on which he was a perfect mine of information. There was not a point of interest about the county with which he was not acquainted, and being an excellent observer, and having a retentive memory, he accumulated a large amount of original information. He was always ready to give a helping hand to the young naturalist, and was always delighted to hear of a new discovery in the county. He had a considerable collection of both plants and birds, but the latter, though excellently set up, are unfortunately not localized. I take this opportunity of acknowledging the kind assistance and encouragement I received from Mr. Robinson in making various collections of plants as well as insects. Though he did not profess to be an entomologist he had much information on the subject.

W. F. JOHNSON.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a Golden Pheasant from Mr. Godden, a pair of Rabbits from Masters J. and G. Armstrong, a Long-eared Owl, a Barn Owl, two Pigeons, and a Hedgehog from R. L. Weldon, Esq., a Sparrowhawk from D. Carton, Esq., a Herring-Gull from R. I. Praeger, Esq., two Green Monkeys from Rev. J. Botrel, and a Cormorant from T. Clibborn, Esq. A seal has been purchased.

9,200 persons visited the Gardens in September.

DUBLIN MICROSCOPICAL CLUB.

JULY 20th.—The club met at Mr. M. HEDLEY'S, who showed a section of a vegetation from a cusp of the nutral valve of a pig's heart, in which the presence of a large number of the bacilli of schweine-rothlauf were present. The section had been stained with gentian, violet, and rosin, and was examined under a one-twelfth oil immersion. It was pointed out that this section had been obtained from an Irish pig by Professor MacFadyean after the animal's arrival and death in Scotland. This disease has often been mistaken for the disease ordinarily known as swine-plague, but in this disease the bacilli are of another character. The schweine-rothlauf bacilli are amongst the most minute of such organisms, and are so closely allied to mouse septicæmia that the difference is best determined by cultivation methods. The specimens are more interesting because they are the first which have been demonstrated as existing in Irish swine. The exhibitor has, since receiving this slide, obtained further specimens among Irish swine.

MR. F. W. MOORE exhibited *Xylaria rhopaloides*, Nutge. This remarkable fungus made its appearance on a piece of wood which had been imported from the Amazon with some orchids. It had not previously been found growing in Britain.

PROF. COLE showed a section of iridescent soda-orthoclase from near Laurvik, S. Norway, illustrating how the play of delicate grey-blue colours in the mass is due to the development of exceedingly minute rods within the crystal. This is an example of "schillerisation" on an unusually small scale. A fine specimen of the syenite in which this mineral occurs has been for some time on view, as a polished tombstone, in Great Brunswick-street, Dublin.

DR. SCOTT showed some sections from some enlargements which grew on the roots of the Bean (*Vicia faba*), and which were sent to him by Mr. G. Pim. The section showed the growths to be composed of three layers, the outer one composed of large spherical cells similar to pith cells. The middle layer was very small, being composed of a few fibro-vascular bundles and single bundles. The inner layer was a mass of spherical cells, somewhat smaller than those in the outer. The cells in the innermost layer were packed with masses of micrococci, in some cases apparently filling up solidly the space inside the cell wall. The stain found most satisfactory was a watery solution of methylene blue.

MR. MCARDLE exhibited a specimen of *Chivolepus aureus*, Linn., a large red alga, with the threads in neat compact tufts, of a brilliant orange colour. It was collected on Carlingford Mountain, Co. Down, by Mr. R. Welch, of the Belfast N.F.C., on the 5th of August, 1893.

BELFAST NATURALISTS' FIELD CLUB.

AUGUST 26th.—Excursion to the Giant's Causeway. A party numbering about sixty proceeded from Belfast by the 8.15 train to Portrush, and thence to the Causeway by the electric tramway. Here they were

joined by a local member, Mr. W. A. Traill, who contributed much valuable information during the day. The various wonders of the Causeway were duly examined, after which Mr. Traill gave a short lecture on local geology, which was much appreciated. Tea at the Hotel, and the election of a number of new members concluded the programme, and the party returned to Belfast by the evening train.

SEPTEMBER 16th.—Excursion to Loughbrickland. A party of over forty took train at 10 o'clock to Scarva, where the demesne of Mr. Reilly was entered, and an examination made of the "Dane's Cast," an ancient fortification that is traceable for many miles in Down and Armagh. The party then drove through Loughbrickland to Donoughmore, where the fine old celtic cross in the graveyard, recently re-erected by the Rector, with the assistance of the Club, was much admired, and some souterrains were inspected. Subsequently, on the invitation of Captain Douglas, the Club inspected two very fine forts at Lisnagead, which are of great dimensions, and each enclosed by two outer rings of earth, and three deep fosses. In the evening tea was provided at Banbridge, after which the business meeting of the day was held, and the party returned to Belfast. On account of the late period of the year, little collecting was done. The best plant found during the day was *Mercurialis perennis*, which was pointed out by Rev. H. W. Lett, growing in a copse near Scarva, its only station in Co. Down.

DUBLIN NATURALISTS' FIELD CLUB.

SEPTEMBER 9th.—Thirty members attended the excursion to Beauparc and the Boyne, where a very enjoyable and profitable day was spent. Most of the party went fungus-hunting, and the results were eminently satisfactory. Mr. Greenwood Pim and Dr. M'Weeney have furnished the following list of species. The initials indicate responsibility for identification. When none are given they are to be understood as jointly responsible. *Agaricus (Lepiota) cristatus*, Fr. (by far the commonest of the few agarics met with); *A. (L.) procerus*, Scop.; *A. (Mycena) tenerimus*, Bk. (M'W.); *A. (Entoloma) rhodopolius*, Fr. (M'W.); *A. (Hypholoma) sublateritius*, Fr. (P.); *A. (Psalliota) arvensis*, Schæff. (P.); *Coprinus comatus*, Fr.; *C. micaceus*, Fr.; *Marasmius oreades*, Fr. (M'W.); *Gomphidius viscidus*, Fr.; *Lactarius excrucius*, Otto; *Boletus luteus*, L.; *B. laricinus*, Bk.; *Polyporus giganteus*, Fr.; *P. fomentarius*, Fr. (P.); *Tremella albidia*, Huds.; *Dacryomyces stil-latus*, Nees (M'W.); *Lycoperdon gemmatum*, Fr. (P.); *Scleroderma vulgare*, Fr.; *Phallus impudicus*, Linn.; *Stilbum erythrocephalum*, Ditm. (M'W.); *Botryosporium pulchrum*, Ca.; *Puccinia primulae*, DC. (M'W.); *P. glechomatis*, DC.; *P. veronicarum*, DC. (M'W.); *P. violae*, Schum.; *P. menthae*, Pers.; *P. umbelliferarum*, DC. (P.); *P. polygoni*, Pers.; *P. buxi*, DC.; *P. lychnidearum*, I.k. (M'W.); *P. variabilis*, Grev. (M'W.); *P. circæe*, Pers. (M'W.); *Uromyces valerianæ*, Schum.; *U. geranii*, DC., on *G. pyrenaicum* (M'W.); *Coleosporium sonchi*, Pers. (on *Petasites vulgaris*); *Melampsora farinosa*, Pers. (M'W.); *Synchytrium taraxaci*, De By and Wor.; *Uncinula bicornis*, Lev.; *Minosphaeria cornata*, Lev.; *Peziza sentellata*, L.; *P. subumbrina*, Bond. ["has not occurred to my knowledge in Britain."—W. Phillips in litt.] (M'W.); *Helotium citrinum*, Hedur. (P.); *Hymenoscypha* sp. close to *virgultorum*, Vahl. (M'W.); *Ascobolus furfuraceus*, Pers. (M'W.); *Bulgaria sarcoides*, Fr.; *Stegia ilicis*, Fr.; *Rhytisma acerinum*, Fr.; *Hypomyces aurantius*, Tul.; *Hypocrea rufa*, Fr.; *Claviceps microcephala*, Tul. (M'W.); *Nec'ria*, two species (P.). There are also other species yet awaiting identification.

The following flowering plants were noted during the day:—*Thalictrum flavum*, *Lysimachia vulgaris*, *Carex stricta*, *Rumex hydrolapathum*, on the Beauparc banks of the Boyne; *Euonymus europæus*, *Calamintha officinalis*, *Lamium album*, *Verbascum thapsus*, rocky bank on the northern bank of the Boyne; *Sagittaria sagittifolia*, *Enanthe phellandrium*, *Utricularia vulgaris*, in the River Boyne; *Ranunculus lingua*, *Hydrocharis morsus-ranae*, old mill-race by the Boyne below Slane. The latter was also found in pools by the Boyne

opposite Beuparc, accompanied by *Armoracia amphibia*; *Ceterach officinarum*, wall at Slane.

Mr. H. K. Gore Cuthbert collected beetles and obtained the following noteworthy species, the first of which is believed to be an addition to the Irish list:—*Anchomenus angusticollis*, *Leistus fulvibarbis*, *Calathus piceus*, *Cœlambus lineatus*, *Lacon murinus*, *Choleva fusca*, and *Cis boleti*.

ARMAGH NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

OCTOBER 6.—Annual General Meeting. The following officers were elected:—President, Rev. W. F. Johnson, M.A., F.E.S.; Hon. Secretary, G. H. Johnston; Hon. Treasurer, F. L. Martin; Hon. Librarian, J. Boyd; Committee, Dr. Gray, W. Gallagher, E. Fullerton, D. A. Simmons, A. Gibson, J. Pellow, S. Greer, S. Davison, R. H. Dorman, E. L. Fischer, R. Best, F. J. Anderson, W. Whitsitt. The funds of the society were not in as good a position as usual, and a deficit of £10 was announced; but, as an offset to this, the members were informed that the late Rev. G. Robinson had bequeathed a sum of £50 to the society.

NOTES.

BOTANY.

PHANEROGAMS.

Autumn Blossoming of Spring Flowers.—The remarkably early season, with its accompaniment of intense heat and drought, followed by a showery autumn, has resulted in a September blossoming of a number of our spring and early summer flowers, and I place on record such cases as have been reported by correspondents, or have come to my own notice: no doubt readers of the *Irish Naturalist* will be able to supplement the list. *Ranunculus circinatus*—there was an abundant second growth of this in the canals near Dublin, and a good deal of flower. *R. pellatus*—Mr. Stewart reports this in flower in several lakes in Co. Down. *Caltha palustris*—Mrs. Leeboddy reports this from Londonderry, and Mr. Stewart from Co. Down. *Viola sylvatica*—in bloom at Londonderry (Mrs. Leeboddy), Cork (Mr. Noonan), and in Co. Meath and north Donegal (R. L. P.). *Cytisus scoparius*—same localities as last. *Lotus pilosus* and *Lathyrus pratensis*—North Donegal (R. L. P.). *Pyrus malus*—Mr. Noonan reports a crab-apple tree “covered with flowers” near Cork on October 10th. *Fragaria vesca*—Cork (Mr. Noonan). *Potentilla fragariastrum*—noted on the Dublin Field Club excursion to Beuparc, Co. Meath. *Lonicera periclymenum*—there was quite a remarkable September flowering of the Honeysuckle; in many counties from Donegal to Queen’s Co., I saw or received notes of its blossoming freely at the same time that it was bearing abundance of bright red berries. *Menyanthes trifoliata*—Killinchy, Co. Down, Mr. Stewart. *Mertensia maritima*—Malin Head, Co. Donegal, September 24th, fine specimens in full bloom, R. L. P. *Equisetum palustre*—a luxuriant new crop with abundance of fruit near Lough Swilly, Donegal.—R. LLOYD PRÆGER.

Plants of the Boyne mouth.—*Cuscuta major*, according to Threlkeld “groweth in great plenty on the dry sandy banks near the Mayden Tower, near Drogheda.” An August afternoon, devoted to a search for this plant, did not result in its re-discovery, although I hunted carefully over the low sand-dunes for some distance around the tower, which is a tall quadrangular building, with a picturesquely battlemented summit, built on the edge of the Boyne in close proximity to its mouth, evidently as a mark for mariners entering the river. The dodders, however, seem to be plants of irregular appearance, often springing up in

abundance for a year or two in localities where they were previously unknown, and as rapidly disappearing; and probably Threlkeld's plant, which was no doubt imported with seed, has long since forsaken its former habitat by the Boyne; at any rate, it does not now occupy the station so explicitly described by the pioneer of Irish botany. As few botanists apparently have visited this spot, it may be worth mentioning the characteristics of the flora, although nothing of special interest occurs. On the sand-dunes *Cynoglossum officinale* is the most abundant plant—excepting *Psamma* and *Ononis*. *Viola curtisii* is frequent; with it grows the rare grass *Festuca uniglumis*, probably its most northerly station in Ireland; it was first found here many years ago by Dr. Moore, as recorded in “*Cybele Hibernica*,” and the rayless form (*S. flosculosus*, Jord.) of *Senecio jacobaea* is more abundant than the type. On the sandy shore grow *Cakile*, *Eryngium*, *Euphorbia paralias*, *Salsola*. In the neighbourhood of the little village of Mornington I observed *Sisymbrium sophia*, *Lychnis vespertina*, *L. githago*, *Malva rotundifolia*, *Geranium pyrenaicum*, *Medicago sativa*, *Feniculum*, *Carduus crispus*, and *C. tenuiflorus*, *Lycopsis*, *Borago*, *Ballota*, *Lamium album*, *Chenopodium bonus-henricus*, *C. murale*; I did not observe *Artemisia maritima*, recorded from this neighbourhood in 1873, by Mr. More (*Journ. Bot.*). By the muddy river-banks, above its sandy mouth, were *Sagina maritima*, *Apium graveolans*, *Statice bahusiensis*, *Beta*, *Obione*, *Suaeda*, *Lepturus*. The most interesting thing at Maiden Tower, however, was not a plant at all, but consisted of the enormous abundance of the extremely local snail, *Helix pisana*, which in Ireland is confined to a strip of the east coast from Rush to Drogheda. Here it occurred in thousands, all over the dunes, and among the maritime plants on the sea-shore; it was in the latter situation that I obtained the finest specimens.—R. LLOYD PRÆGER.

Allen Plants at Greenisland, Belfast.—Mrs. White-Spunner sends me specimens of an interesting group of casuals gathered by her at one spot near Greenisland. The plants are *Sisymbrium sophia*, *Thlaspi arvense*, *Erisynum orientale*, *Linum perenne*, *Lychnis vespertina*, *Melilotus alba*, *Cichorium intybus*, *Hyoscyamus niger*, *Galeopsis speciosa*, and an exotic *Linaria*, with handsome purple flowers, which I have not identified. Some of the above are admitted as natives in the Co. Antrim flora, but in the present instance the bad company which they are keeping is fatal to their claim. From inquiries which Mrs. White-Spunner has made, it appears that fowl were kept at the place in question, and that they were fed with foreign grain; which is an ample explanation of the appearance of the plants in question.—R. LLOYD PRÆGER.

***Limosella aquatica* in Ireland.**—Early in July last, Mr. O'Kelly, of Ballyvaughan, sent me some specimens of *Limosella aquatica*, which he had gathered on the margin of Lough Inchiquin, near Corofin, in the Co. Clare. This plant had not, it is believed, been previously found in Ireland, though it is mentioned by Wade in his “*Plantæ Rariores*” as “frequently occurring where water has stood during the winter—Co. Galway, near Ballynahinch, Connemara;” but this locality has not since been confirmed by any other botanist. About one month after the discovery of the plant by Mr. O'Kelly, being in the neighbourhood of Corofin, I visited the lake, which, owing to heavy rain, had in the interval risen about three feet, and submerged the *Limosella* to a depth of nearly two feet. I was able, however, with the help of a boat and drag, to procure some plants, which then presented a totally different appearance to that of the specimens sent me by Mr. O'Kelly, having apparently, after submergence, cast off most of the old leaves with the ripened fruits, and developed a fresh crop of bright green young leaves, the stems of which were in some instances elongated to as much as four or five inches. This stage of the plant's growth does not appear to have been previously noticed, and may be due to the abnormal season. Mr. O'Kelly has, since my visit, discovered the *Limosella* in two other localities in the neighbourhood of Gorst, in the Co. Galway, and no doubt the very dry season and consequent low state of the water in the lakes and “turloughs” has

brought to light this plant, which, in ordinary years, is probably nearly always under water, and has thus escaped the notice of botanists. The discovery now is a welcome and valuable addition to the Flora of Ireland.—H. C. LEVINGE (in *Journal of Botany* for October).

ZOOLOGY.

ARACHNIDS.

Phytoptus geranii at Howth.—We have received from Mr. F. W. Burbidge, shoots of *Geranium sanguineum* injured by this mite, which has been identified by Dr. Maxwell T. Masters (*Gardeners' Chronicle*, 16th September, 1893). The leaves are swollen and rolled round at the margins, thus forming shelter for the mites; while the unhealthy stimulation which these produce on the growth of the plant, provides their food-supply. Mr. Burbidge informs us that plants injured in this way were common at Howth this year.

INSECTS.

The Clouded Yellow Butterfly (*Colias edusa*) at Cork.—While walking on the cliffs at the mouth of Cork Harbour on the 4th instant, I saw a good many of *Colias edusa*. I could not catch any, as I had no net with me.—S. WESTROPP, Cork.

Additional Coleoptera from Courtown, Co. Wexford.—The following additions were made last August, to the list of Coleoptera published in the *Irish Nat.*, vol. i., p. 168:—*Cicindela campestris*, *Pterostichus cupreus*, *Haliplus confinis*, *Hydroporus rivalis*, *Leistotrophus murinus*, *Choleva fusca*, *Saprinus maritimus*, *Byrrhus dorsalis*, *Cytilus varius*, *Aphodius rufescens*, *Phratora vulgatissima*, *Galerucella tenella*, *Crepidodera helixines*, *Apion miniatum*, *Otiorrhynchus scabrosus*, *Helops pallidus*.

This is a small list, but beetles are not plentiful anywhere about the middle of August. *Cicindela campestris* was scarce, though its larvæ were very abundant. *Helops pallidus* has not, I believe been hitherto recorded from any Irish locality. *Adimonia tanaceti* was apparently abundant last August, though scarce in the district in August, 1892.—H. K. GORE CUTHBERT.

MOLLUSCS.

Rare Shells from Co. Sligo.—Mr. W. Kennedy of Londonderry has just sent me three of our rarest species of Land Mollusca, which he took in Co. Sligo as far back as 1863. Two of these have never been taken before in the West of Ireland, and the third is new to district IX. (see my List of Land and Fresh-water Mollusca in *Irish Naturalist*, 1892). The following are the three species:—*Clausilia laminata*, Mont., from an island in Lough Gill, near Sligo; new to district IX. and to the West of Ireland. *Bulinus obscurus*, Mull., from the south slope of Knocknarea, near Sligo; new to district IX. and the West of Ireland. *Helix lamellata*, Jeffr., from an island in Lough Gill, near Sligo; new to district IX.—R. F. SCHARFF, Dublin.

***Helix rufescens* in the North of Ireland.**—In the last number of the *Irish Naturalist* there is a note by Dr. Scharff on the occurrence of *Helix rufescens* in the north. This reminds me of what my cousin, Mr. Taylor, told me some years ago, in reference to this shell being procured near Belfast. He said that in his boyhood *H. rufescens* was never found in the neighbourhood until it travelled there amongst some rose-trees sent to his mother from Castletown, Co. Cork, and planted in her garden in Cliftonville, from which locality it was supposed to have spread. The time was about 1848.—AMY WARREN, Moyview, Ballina.

***Helix arbustorum*, L. in Leitrim.**—Mr. William Kennedy, of Londonderry, having recently informed me that he had collected *Helix arbustorum* at Glencar Waterfall; in response to a request for further information in respect to this important find, Mr. Kennedy forwards specimens, and detailed information of his discovery. The specimens are three in number, and Dr. Scharff considers them very fine examples of the typical form. As Antrim, Down, and North Donegal (a single dead specimen) are the only authenticated stations in Ireland for this handsome snail, Mr. Kennedy's careful and accurate notes are of interest:—"On referring to my memoranda in connection with this species, I find that I got altogether at the same place five specimens; the dates are:—4th June, 1863, one immature specimen; 19th August, 1864, two living, mature; 28th September, 1865, one living, and one dead specimen. All were found in the long grass growing among the trees and shrubs at Glencar Waterfall, not more than three or four yards from the waterfall, and in the bottom at the glen. On the occasion of my first visit to the locality, 4th June, 1863, the late Dr. Samuel Brown, Inspector of National Schools, then much interested in land and fresh-water molluscs, was with me, and he got, I think, one or two specimens."—R. LLOYD PRAEGER.

***Helix fusca* in Co. Dublin.**—The only record we possess of this rare species for the county, is that in Turton's work who mentions merely "wood in Dublin." No one else seems to have found it since, and I am glad to be able to confirm the record, as my brother took it abundantly after the recent heavy showers in the Lucan demesne.—R. F. SCHARFF, Dublin.

A new Irish species of Arion.—In the *Annals and Mag. of Nat. Hist.* (6th s.) vol. xii. Oct. 1893, Mr. W. E. Collinge, the editor of the *Conchologist*, describes a new species of *Arion*. It was discovered at Schull, Co. Cork, by Mr. Phillips, and is named *Arion flagellus* by the describer. Mr. Collinge very kindly allowed me to examine the type specimens. The external characters do not differ materially from the typical Irish *Arion subfuscus* except that the colour is darker, but it has this in common with almost all the specimens found on the west coast. The two principal anatomical characters on which the species is based, are the constrictions of the oviduct and the presence of a flagellum. With regard to the former, it is not different from the shape assumed by an oviduct during and after the passage of the ova. The flagellum is of more importance, and would in itself be sufficient to specifically distinguish *A. flagellus* from allied species. As far as I could ascertain, however, without cutting sections of the flagellum, it appears to be but a portion of the extractor muscle, which is attached at that point to the oviduct. I cannot therefore convince myself that the species referred to, is anything else than a variety of the variable *A. subfuscus*.—R. F. SCHARFF, Dublin.

BIRDS.

Redbreasted Snipe (*Macrorhamphus griseus*, Gmel.) in Ireland, a new American Visitor.—On the 29th September I obtained a specimen of the American Redbreasted Snipe, which was forwarded from Maryborough, Queen's Co., along with a lot of Common Snipe. The bird is a female in the immature autumn plumage, and has not hitherto been recorded from Ireland.—E. WILLIAMS, Dublin.

Great Snipe (*Gallinago major*), and Sabine's Snipe (*G. cœlestis*, var. *sabinii*) in Ireland.—I have received a fine Great Snipe, shot by Mr. T. L. Mason, at Ballycroy, Co. Mayo, on the 13th October. The bird weighed seven ounces, and looks fully half as large again as a Common Snipe. On the 28th September, Mr. R. W. Peebles shot a particularly dark example in Co. Tyrone, of the variety called Sabine's Snipe. The whole bird is dark smoky-black, legs greenish-black, and wanting the longitudinal stripes on back.—E. WILLIAMS, Dublin.

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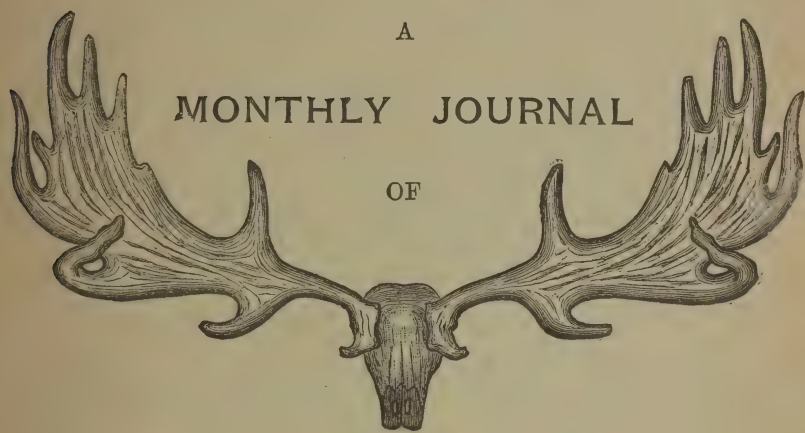
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ARAN ISLANDERS.

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DECEMBER, 1893.

No. 12.

THE ARAN ISLANDS, COUNTY GALWAY: A STUDY IN IRISH ETHNOGRAPHY.

BY PROFESSOR A. C. HADDON, M.A.

THE IRISH NATURALIST is itself a witness to the increased interest which has of late years become manifest in the study of Natural History in Ireland, and it is encouraging to see notes from new observers in various parts of the country. It would be very undesirable to divert to other channels any of the energy which has now been brought to bear on Natural History, but there must be a large number of persons in Ireland who do not take any special interest in any one group of animals or plants, and have no taste or opportunity for making collections, but who, nevertheless, would like to occupy their leisure with something that is both interesting and worth doing. To such I would commend the study of the Irish Man.

It is surprising how little attention we have given, in the British Islands, to a study of our fellow-countrymen, whether from an anthropological or from a sociological point of view. In this respect we are far behind the great continental nations. Nor is it from lack of suggestive facts to be recorded or of problems to be solved. The mixture of races in these islands certainly renders the problems complex, but this should not paralyse effort. Very interesting results may be expected from a careful study of certain groups of the populace, but to gain them immediate action must be taken. Owing to migration and emigration, the mingling of peoples has become more intimate, and the newspaper and the school-board have been potent in sweeping away local customs and in levelling up the less advanced folk. All we can now do is to record the little that remains of old-time custom and thought. Experience, however, shows that more persists beneath the surface than is

generally conceded by those who vaunt themselves on our present civilization and religion. The civilization of the British Islands is, after all, comparatively so recent that relics of the previous millenniums of savagery and barbarism are continually cropping up.

For some years past I have been increasingly impressed with the importance of these studies, and I recently determined to make a beginning with the Aran Islands in Galway Bay, as being in every way suitable for such researches. It was, therefore, with great pleasure that I found my friend Dr. C. R. Browne was able to join me in making the first of what I hope will be series of studies in Irish Ethnography, conducted in connection with a Committee appointed by the Royal Irish Academy for that purpose. Our joint investigations have just been published in the *Proceedings of the Royal Irish Academy* (3rd series, vol. iii., 1893, pp. 768-830, pls. xxii.-xxiv.

The Aran men are mostly of a slight but athletic build, the average height is about 5 feet $4\frac{3}{4}$ inches, whereas that of the average Irishman is said to be 5 feet $8\frac{1}{2}$ inches. The span is less than the stature in a quarter of the cases measured, a rather unusual feature in adult males. The hands are rather small, but the forearm is often unusually long.

The head is well-shapen, rather long and narrow; there is a slight parietal bulging. Anthropologists classify heads according to the relation between the length and the breadth; the length is taken as 100, and long narrow heads (dolichocephals) are those in which the ratio of breadth to length is as 75, or less, is to 100; the short broad heads (brachycephals) have a ratio of 80, or more, to 100, whereas the mesaticephals are intermediate between these two. The mean "cephalic index," as it is termed, of the Aranites is 77·1, but it has been shown that in order to more accurately compare the cephalic index calculated upon measurements made on the living head with that of skulls, it is necessary to deduct two units from the former; this gives 75·1 as the Aran cephalic index. I find that the mean index of seven Aran skulls is 75·2, consequently the average head is to a very slight extent mesaticephalic, although the number measured is nearly evenly divided between mesaticephalic and dolichocephalic. The face is long and oval, with well-marked features, the eyes are rather small and close together, and marked at the outer corners by transverse

wrinkles. The irises are in the great majority of cases blue or blue-grey in colour. The nose is sharp, narrow at the base, and slightly sinuous. The cheek bones are not prominent. In many men the length between the nose and the chin has the appearance of being decidedly great. The complexion is clear and ruddy, and but seldom freckled. On the whole the people are decidedly good-looking. The hair is brown in colour; in most cases of a lightish shade and accompanied by a light and often reddish beard. Eighty-nine per cent. of both men and women had blue or light-grey eyes; sixty-three per cent. had light brown hair, and about twenty-six per cent. had dark brown hair.

According to the last census (1891) the total area of the three islands is 11,288 acres, with a population of 2,907, 1,542 being males and 1,365 being females. The gross rental is £2,085 10s. 6d. The north island, Aranmore, has 7,635 acres, 397 houses, 1,048 males, 948 females (total 1,996), and a rental of £1,433 18s. 1d. The middle island, Inishmaan, has 2,252 acres, 84 houses, 240 males, 216 females (total 456), and a rental of £423 18s. 5d. The south island, Inisheer, has 1,400 acres, 81 houses, 254 males, 201 females (total 455), and a rental of £227 14s. From these statistics it will be seen that there is an average acreage of 20a. or. 13½p. to each house of five persons, and the corresponding rental is £3 14s. 2½d. The density of the population is 171 to the square mile, that of Co. Galway is 87, and for the whole of Ireland 146. It should, however, be borne in mind that a large proportion of the land in the Aran Islands is incapable of cultivation.

Irish is spoken by 88·47 per cent. of the people, of whom 77·2 speak Irish only.

The inhabitants of one island do not, as a rule, intermarry with those of another, and but little fresh blood can have been introduced for generations. The people of each locality are more or less inter-related, even though marriages between those of close degrees of relationship may not be usual. This accounts for the general similarity in personal appearance which is observed among them, but no appreciable ill effect results from the in-breeding. The population seems on the whole to be an unusually healthy one.

The older writers give very pleasing accounts of the psychology of these people—"brave, hardy, industrious,

simple and innocent, but also thoughtful and intelligent, credulous, temperate, with a high sense of decency and propriety, honour and justice, communicative but not too loquacious, hospitable and honest." According to these authors there is scarcely a virtue which is lacking to the people; but one writer adds: "I am afraid things are very much changed since those days."

All the men are land-owners to a greater or less extent; the holdings, or *cannogarras*, as they are termed, vary from about 11 to 14 acres, the supposition being that each *cannogarra* can feed a cow with her calf, a horse and her foal, some sheep for their wool, and give sufficient potatoes to support one family. Most of the fields are very small in size, and are surrounded by walls composed of stones piled loosely on one another; there are no gates or permanent gaps in the walls. A man usually owns a number of isolated fields scattered all over the island.

Only a fraction of the land is naturally fit for anything, and probably a considerable portion of the existing soil has been made by the natives bringing up sea-sand and sea-weed in baskets, on their own or on donkeys' backs, and strewing them on the naked rock after they have removed the loose stones. Clay scooped from the interstices of the rock may also be added. Farmyard manure is little used in the fields. Only spade labour is employed in the fields. Potatoes are grown in this artificial soil; after a few crops of these grass is sown, and later rye. The latter is cultivated for the straw, which is used for thatching; the rye-corn is not now employed for eating purposes. Sweet grass grows in the crevices of the rocks, and this forms, in addition to the meadows, the usual pasturage for the sheep.

The farm will usually keep a family in potatoes, milk, and wool. Flour and meal are imported from Galway along with tea and other foreign produce. For fuel the Aranites employ peat and cow-dung; all the former is imported from Connemara. Kelp is made in considerable quantities.

The bulk of the men on the north island may be described as small farmers who do a little fishing. There are, besides, two or three weavers, tailors, and curragh builders. The butcher, baker, and other allied tradesmen are mainly related to the small population, which may fairly be termed foreign,

such as the representatives of the Government and the spiritual and secular instructors.

A family usually consists of six or seven children. These go to school regularly, and are intelligent and make fair progress. They early help their parents in various ways. The girls marry early, seventeen is quite a common age. There is no courting, nor do the young people ever walk together.

The dress of both sexes is for the most part home-made, being largely composed of homespun, either uncoloured or of a speckled brown or blue grey, or bright red colour. The people appear not only to be warmly clad, but, as a rule, to be over-clothed. Both sexes wear sandals made of raw cowhide, the hair being outside. These "pampooties," as they are called, are admirably adapted for climbing and running over the rocks and loose stones. Some of the men are now taking to wearing leather boots.

The houses of the better class consist of three rooms—a central kitchen, and a bedroom at each end; but many houses have only a single bedroom. The walls are built of irregular stones, and may be placed together with or without mortar. There are always two outside doors opposite one another in the kitchen. Very often there is a small pen by the side of the large fire-place for the pigs, which are very clean both in their bodies and habits. The kitchen floor may be the bare rock or clay, or it is very rarely boarded. The thatch is tied on with straw ropes.

Twenty years ago there was not a wheeled vehicle in the islands. Even now there are no roads worthy of the name in the Middle and South Islands, and till lately there were not many in Aranmore. Carts are still very rare, and the carrying is done by human portorage or by donkeys and horses. All the well-to-do men own a mare. A poor man will have only a donkey.

We were not able to collect much in the way of folk-lore. In common with a large part of Ireland, the Aranites believe in fairies, banshees, ghosts, the evil eye, etc. When a funeral is passing down the road the front door of a house is always closed. The corpse is carried out through the back door. Some days are considered unlucky upon which to begin any work of importance, to get married, or even to bury the dead. If they have occasion to bury a corpse on one of these days,

they turn a sod on the grave the previous day, and by this means they think to avoid the misfortune attached to a burial on an unlucky day.

There are numerous sacred spots such as "saints' beds," holy wells and rag-bushes at which cures can be effected and miraculous help afforded.

Amongst other survivals may be noted certain details in the costume, and especially the raw hide sandals. The curraghs are similar in general character to those common along the west coast, the single oars are pivotted on thole-pins. Stone anchors are still used, more frequently in the Middle and South Islands. Querns are not now used, but it is not long since they were employed. The spinning-wheel is similar to that used in various places along the West, but it differs from that employed in the North.

The antiquities of the Aran Islands have never been systematically described and published; and yet nowhere in the British Islands are there so many and so varied remains associated within a like limited area. The Islands may not inaptly be described as a unique museum of antiquities.

There are many places in Ireland which are as worthy of a careful study as the Aran Islands, and I hope that some of our readers will pay attention to this subject. I shall be very pleased to enter into correspondence with any that would like to study the ethnography, sociology, or folk-lore of their particular district. Letters addressed to the Royal College of Science, Stephen's Green, Dublin, will always find me.

Through the kindness of the Council of the Royal Irish Academy, I am able to reproduce one of the plates of the original paper, which was prepared from a photograph taken by myself.

PLATE 8.

Fig. 1. Colman Flaherty, Thomas, aged about sixty years, Oghil.

Fig. 2. Michael O'Donnell, John, aged fifty-three.

N.B.—When there is more than one man of the same name in the Aran Islands the individuals are distinguished by the addition of their father's Christian name, as in the foregoing cases. Flaherty is a thirteenth child, and according to the tradition of the island should be a piper, but he cannot play the bagpipes; he is a very typical Aranite. O'Donnell's ancestor came from Ulster. They are standing in front of St. Sournick's thorn.

Fig. 3. Michael Mullin, aged 21 years, Kilonan. A typical Aranite.

NOTES UPON SOME IRISH MYRIOPODA.

By R. I. Pocock, British (Nat. Hist.) Museum.

SOME two or three years ago, Dr. R. F. Scharff, of Dublin, generously placed at my disposal for determination some species of Myriopoda which he had collected in various parts of Ireland; and this series was further supplemented by some specimens obtained by Mr. G. H. Carpenter, which this gentleman also kindly submitted to me for examination.

Before sorting and carefully scrutinising this material, I was in hopes that some new or interesting forms might be contained in it. But unfortunately the results did not come up to my expectations. For all the specimens that could be named proved to be referable to species that occur commonly in the south of England, and could be without difficulty obtained by an hour's diligent collecting. Mr. Carpenter has since sent me a second instalment of Irish Myriopoda, six of which were not contained in the set that was first examined. Five of these, however, are forms that are of common occurrence in England and on the Continent; but the other, namely, *Polydesmus gallicus*, furnishes a valuable addition to the myriopod fauna of the British Isles. The chief interest in the discovery of this species centres in the fact that it belongs to the South-Western and Azorean element of the European fauna.

It is highly probable that fresh investigations of this unknown portion of the fauna of Ireland will show that many of our English species are not to be found there; and further, it is not improbable that some species will be discovered that are unknown in Great Britain. Both or either of these discoveries will of course open up interesting questions for future study and explanation.

In the south of England and Wales some fifty species of Myriopoda are known to occur, although not one-half of this number has been hitherto recorded in print. It is not probable that the species in Ireland will greatly exceed this total. So that in a few years a complete, or almost complete, list of all the existing species might be drawn up, and our knowledge of the group would be thus made as complete as our knowledge of the butterflies of England. To compass this end, which

may in reality be so easily attained, it is to be hoped that naturalists resident in Ireland will begin to pay some attention to these interesting but much neglected animals.

LIST OF THE SPECIES.

CHILOPODA.

(CENTIPEDES.)

FAMILY LITHOBIIDÆ.

Lithobius forficatus (Linn).

Poulaphuca, Co. Wicklow; Dingle; Glengariff; Bere Island (Bantry Bay).

Common throughout the whole of N. Europe; occurs also in N. America.

L. variegatus, Leach.

Dublin mountains; Dalkey Island; Kilruddery, Glen of the Downs (Co. Wicklow); Enniskerry (Co. Wicklow); Kylemore (Connemara); Killarney; Castletown Berehaven; Glengariff.

Abundantly distributed throughout the British isles, and occurs also in Jersey. It has not yet, however, been recorded from any part of the continent of Europe.

This is a handsome species, rivalling *L. forficatus* in size, but readily to be distinguished from it by its variegated yellow and blue colouring, larger head, longer and thinner anal legs, etc. *L. forficatus* is a uniform chestnut.

In the south of England it is a noticeable fact in connection with these two species, that *L. forficatus* is found most abundantly under bricks and planks, in or near yards, outhouses, etc. *L. variegatus*, on the contrary, is found under stones and tree-trunks in woods, or the open country.

These facts in distribution suggest that *L. forficatus* has been introduced into our country later than *L. variegatus*.

L. melanops, Newp. (*glabratus*, C. Koch et alii).

Poulaphuca, Co. Wicklow; Castletown Berehaven; Derrynane.

This species somewhat resembles *L. variegatus* in colouring. It is, however, considerably smaller, and has only four instead of ten maxillary teeth.

L. microps, Meinert.

Glengariff.

This species is abundant in the S. of England, and, at least, in the northern parts of Europe. It is one of the smallest of the genus, and may be readily recognised by the fewness of the ocelli, and by the very small number of spines upon the anal legs.

FAMILY SCOLOPENDRIDÆ.

Cryptops hortensis, Leach.

Dublin.

Common all over Europe.

FAMILY GEOPHILIDÆ.

Geophilus flavus, De Geer (*longicornis*, Leach).

Dingle; Glengariff; Kylemore (Connemara).

Common all over Europe. Easily recognizable from the other British species by its long cylindrical antennal segments.

Gophilus carpophagus, Leach (*sodalis*, Mein., *condylogaster*, Latz.).

Great Sugar-loaf mountain.

Also common all over Europe. About as large, or rather larger, than the preceding, with shorter anal legs and antennæ, and of a deeper chestnut colour. Easily to be recognised from all its allies by the ball-and-socket method of articulation of the anterior sterna.

Linotænia crassipes, C. Koch.

Kinsale.

A widely-distributed, but not very common species. Usually attracts attention owing to its nocturnal phosphorescence.

L. maritima, Leach.

Portmarnock, co. Dublin (beneath stones at low-water).

This species is one of the two interesting forms of British *Geophilidæ* which are found beneath stones below tide. In England it has been obtained on the coast of Cornwall and Devon. It has also been recorded from St. Malo and Denmark.

Stigmatogaster subterraneus (Leach.)

Dublin; Dingle.

Common in the British islands and N. Europe, but replaced in S. Europe by a distinct form, *S. gracilis* (Mein.) Distinguished from all the British *Geophilidæ* by its large and coarsely-porous anal pleuræ.

DIPLOPODA.

(MILLIPEDES.)

FAMILY POLYXENIDÆ.

Polyxenus lagurus (Linn.)

Phoenix Park, Dublin.

Abundant in N. Europe upon wooden fences, etc.

FAMILY GLOMERIDÆ.

Glomeris marginata (Villers.)

Ballinderry (Co. Antrim); Rostrevor; Howth; Leixlip; Kells, Co. Meath; Woodenbridge, Glen of the Downs (Co. Wicklow); Castletown Berehaven; Killarney; Glengariff; Kylemore (Connemara); Bundoran.

The only species of the genus known in the British islands. It is also common in most parts of Europe. In the southern parts of the Continent an immense number of "colour-species" of the genus are found. Immature specimens of this species often show signs of the spotting which is so characteristic of the more southern representatives of the genus.

FAMILY POLYDESMIDÆ.

Polydesmus complanatus (Linn.)

Kylemore (Connemara).

Common throughout Europe and the British isles. In England occurs under bark, planks, etc.; very rarely under stones.

P. gallicus, Latz.

Armagh; Mullingar; Lismore; Castletown Berehaven; Glengariff.

The discovery of this species is extremely interesting, inasmuch as it is new to the British Isles. It was recorded originally from Normandy, and is almost certainly identical with a form named *coriaceus* from the Azores.

Brachydesmus superus, Latz.

Glengariff.

Common in England, Scandinavia, Austria, etc. The genus *Brachydesmus* may be recognised from *Polydesmus* by possessing nineteen body-segments instead of twenty.

FAMILY CHORDEUMIDÆ.

Atractosoma polydesmoides (Leach).

Dublin (Leeson-park); Armagh.

Common throughout the south of England, but not yet recognised on the Continent.

FAMILY IULIDÆ.

Blaniulus fuscus, Stein.

Enniskerry (Co. Wicklow); Kylemore (Connemara).

Blaniulus may, in a rough way, be recognised from the following genus *Iulus*, by the absence of longitudinal striæ on the dorsal surface of the segments. *B. fuscus* is common in the south of England.

Iulus luscus, Mein.

Enniskerry (Co. Wicklow); Derrynane; Kylemore (Connemara).

Not uncommon in the south of England. A small nearly uniform pale, brownish species, without a caudal process. Found under stones.

I. punctatus, Leach. (*silvarum*, Mein).

Dublin mountains; Enniskerry; Kylemore; Glengariff; Killarney.

Common all over the south of England, Denmark, Scandinavia, etc. Always found in rotten wood, never under stones. A pale, brown-banded and brown-spotted species, with the caudal process rounded and clavate at the tip.

I. pilosus, Newp.

Enniskerry (Co. Wicklow); Poulaphuca; Kylemore; Killarney; Drogheda.

Some of the specimens that are here referred to *I. pilosus* are immature, and, consequently, may be wrongly determined. The adults are all females, and since no males were obtained, the identification must be accepted with reservation.

I. niger, Leach (*transverso-sulcatus*, Stein, *albipes*, C. Koch).

Tibbradden mountain (Co. Dublin); Devil's Glen (Wicklow).

This species when adult is black with very pale legs; it is one of the largest British species; has an acute caudal process, and may be at once recognised by the presence of transverse striæ upon the anterior half of the body-segments.

I. sabulosus (Linn.)

Tibbradden mountain (Co. Dublin); Belmont and Devil's Glen (Wicklow).

This is a large species, with a long acute caudal process like *niger* and *pilosus*. It may, however, be recognised at a glance from both of these by the presence of two yellow stripes along the dorsal surface.

For the specimens from Castletown Berehaven, I am indebted to the Committee appointed by the Royal Irish Academy to investigate the Irish fauna and flora; and I would express my thanks to that body for the opportunity of including the records in the above list.

A VISIT TO ROUNDSTONE, CO. GALWAY.

BY PROF. T. JOHNSON, D.S.C.

A COMMITTEE was recently appointed by the Royal Irish Academy to take steps to complete, as far as possible, our knowledge of the Fauna and Flora of Ireland. For this purpose a portion of the annual government grant, at the disposal of the Academy for scientific investigations, was set apart by the Council, and, as one of the committee appointed, I spent a week in September last investigating the marine algæ of Roundstone Bay, Co. Galway.

The district of Roundstone, almost at the foot of the famous Twelve Pins of Connemara, is one of the most interesting in Ireland, and in the early part of the century was called the land of promise in natural history. In 1835 Professor C. Babington, of Cambridge, in company with the late Mr. J. Ball and another friend, visited Connemara, and discovered a number of rare and interesting objects of natural history. An account, full of interest, of the journey is given in the *Magazine of Natural History* (vol. ix., p. 119 *et seq.*) Subsequently Professors D. Oliver, J. H. Balfour, Harvey, Dr. D. Moore, Mr. A. G. More, etc., visited the district, and added considerably to the knowledge of its natural history. During his 1835 journey Professor Babington met W. M'Calla, of whom he says he was "the son of the landlord of the inn at Roundstone,—a young man, who, although labouring under very great difficulties, has, by his own unassisted exertions, with an almost total want of books, obtained a very complete knowledge of the geology, mineralogy, conchology, and botany of the neighbourhood of Roundstone. He has now, I am happy to learn, obtained the situation of national school-master at Ballinahinch." M'Calla's name, as many of my readers know, and as this kindly notice would lead one to expect, became well known in Irish natural history, and is perpetuated in the species *Cladophora macallana*, Harv., as well as in his excellent *Algæ Hibernicæ*, two volumes of seaweeds, prepared by M'Calla, mostly from specimens obtained at Roundstone. I made it my duty to find out all I could about M'Calla and his collections. I interviewed one old man, Patsy Ashe, living in a cabin on the mountain-side, who

remembered him well as a schoolfellow, but told me there was no representative of the family left, and could give me no information as to any of M'Calla's collections. M'Calla, as Harvey states, died from cholera in 1849, a comparatively young man. I was shewn, in the churchyard at Roundstone, a substantial monument erected, as the inscription stated, to M'Calla's memory by his admiring brother naturalists. Unfortunately Roundstone is by no means easy of access,¹ being 50 miles west of Galway, the nearest railway station, and also off the direct mail-car route to Clifden. Beyond the breakdown of the mail-car shortly after leaving Galway, a consequent loss of time, and a drenching later in the day, I reached Roundstone without trouble. Once there, there is every reason to be satisfied with the field of work. I was fortunate in obtaining the services of a man, Creelish Martin, who, besides being a reliable and experienced sailor, understands the working of a dredge, and has a very good knowledge of the sea-bottom as regards its physical and, to a certain extent, natural history features. With his help, and the use of a sailing boat (from J. Cloherty), I got several days' dredging in Roundstone and Birturbui bays. Roundstone Bay, as readers of Harvey's *Phycologia Britannica* know, is characterised by a large development of the calcareous red algæ known as the *Corallinaceæ* (formerly as *Nullipores*), two species, *Lithothamnion fasciculatum*, Aresch., and *Lithothamnion agariciforme*, Aresch., being confined to the district, and first discovered² there by M'Calla. Of the twenty-five species of *Corallinaceæ*, known at present to occur in British waters, the great majority are to be found in the bay. My object in going to Roundstone was rather to search for species added to the marine flora of Britain since the publication of Harvey's great work, the *Phycologia Britannica*, in 1846-51, but not yet recorded from Ireland. Many of these species are minute epiphytic forms, often only to be recognised by a detailed microscopic examination. As I stated in a former article in

¹ The light railway from Galway to Clifden, when completed, in August, 1894 (?), will take one within five miles of Roundstone.

² I showed my man, Creelish, Harvey's coloured figures of these and other species, and was not a little pleased to see them brought up in our first hauls, the coralline being in several fathoms of water, north of Roundstone.

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ERRATA.

- Page 26, line 6, for "Carval" read "Caracal."
 „ 16 and 17 from bottom, for "as Monstroma does from
Ulva," read "as *Ulva* does from *Monostroma*."
 „ 173, „ 27, for "*Ammophila sabulosa*," read "*Pompilius fuscus*."
 „ 227, last line but one, for "Scharff" read "Schaeff."
 „ 229, line 33, for "Cotton" read "Collon."
 „ 229. The note on *Azolla* should be transferred to special heading
 "Vascular Cryptogams."
 „ 243, foot-note, line 2, for "formed" read "former."
 „ 279, last line, for "fourth, fifth, sixth, and seventh" read "third,
 fourth, fifth, and sixth."
 „ 280, line 2, for "seventh" read "sixth."
 „ 302, line 41, for "extractor" read "retractor."

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Wrightia arenosa, 26.

Xylaria rhopaloides, 297.

The Irish Naturalist (April, 1892), one interesting group, only revealed within the last few years, is that of the microscopic algæ found perforating the shells of mollusca, &c. Of these I made a large collection at Roundstone, and am now engaged in their identification. The western shore of the bay, on which the town stands, is not a very good locality for collecting, the weeds north of the town being dirty and somewhat uninviting. South of the town there is an improvement, increasing as the mouth of the bay is reached. I found the rock-pools south of The Beaches, between Gorreen and Dog's bays, those on the south-west point of Inishnee (an island between Roundstone and Birturbui bays), those north of the landing place at Moyrus, on the mainland (where beds of *Zostera* and *Lithothamnion calcareum* are exposed at low water in spring tides), those on the islands of Croagnakeela (locally Deer Island, and difficult to land upon), and MacDara, the most promising localities for shore-hunting. On the island of Saint Mac Dara there are the ruins of a church, 12 x 12 ft., with only a little of the stone roof left, with walls three feet thick, and a peculiarly constructed east window. Close by are several stone tablets with inscriptions, readily traceable apparently, but, up to the present, I am told, uninterpreted. Botanists will be interested to know that Saint MacDara is locally highly revered as the patron saint of the new potatoes, which come in in July. It is the custom to throw water on the boat's sails three times, in passing the island, to avoid shipwreck. On the only afternoon I had free from my weeds I was taken by Mr. Frank M'Cormick over the northern shoulder of Urrisbeg (998 feet) to see the only habitat in the district of *Adiantum capillus-veneris* (the Maiden-hair fern) growing in the crevices of a rock, facing south-west, at the extreme north-east corner of Lough Bulard. Spite of the recent very dry season, the spoliation by tourists, and the injudicious application to the surface of the rock of cement, the species is as well established here as when visited by Babington 60 years ago. I spent some fruitless time one afternoon in a waning light searching for the rare *Naias flexilis* in the lake in which Professor D. Oliver found it in 1850. Though an unfortunate stoppage of my work for some weeks, since my return from Roundstone, has prevented me from examining more than a small part of my collection, I am con-

vinced that a thorough investigation of the marine flora and fauna would well repay students of botany and zoology,¹ and could, with the means available there, be carried out without much difficulty.

THE ANATOMICAL CHARACTERS OF *ARION FLAGELLUS*, CLLGE.

BY WALTER E. COLLINGE.

THE anatomical features of this recently-described *Arion* are so pronounced, and distinct from any other known European species, that I should not have thought it necessary to reply to my friend Dr. Scharff² had he not—most unintentionally, I am sure—misrepresented the published account of its anatomy.³

It is of little importance, but still I contend that *A. flagellus* does differ in colour from *A. subfuscus*. The most important external character—which Dr. Scharff entirely overlooks—is the small caudal mucous gland. So constant is the form and size of this gland—as might be inferred from the importance of its function—that not a few malacologists have used it as a feature in generic distinction. I have examined very large series of *Arions* from almost every part of Europe, but have never in any single instance found it vary, and I am not aware of any published instance either. I, therefore, think the point is one worthy of note in the *aggregate characters* of this species, which is not described from any single one, but from the general anatomy.

The exact importance of the myology of the Mollusca as a feature in generic or specific distinction I am as yet undecided upon, but quite recently Lt.-Col. H. H. Godwin, F.R.S., has placed great importance upon the position of attachment of certain muscles, *e.g.*, the retractor muscles of the eye, generative organs, &c., and finds that in certain genera these are subject to but slight variation. Now, in *A. flagellus* there are a number of differences in the form, &c., of the muscles, which I did not

¹ I am hoping that Dr. Loftus, of Roundstone, whose acquaintance I made, will become a present-day M'Calla.

² *Irish Nat.*, vol. ii., 1893, p. 302.

³ *Ann. and Mag. N. H.*, 1893 (6th s.), vol. xii., p. 252.

describe—but which Dr. Scharff should have seen,—as I was doubtful as to what amount of importance should be attached to them. The two most important are the position of attachment of the tentacular muscles, and the length and position of the genital retractor.

I purposely stated that the alimentary and nervous systems agreed very closely with *A. empiricorum*, Fér.—I do not mean *A. ater*, L.—and to now find such classed as *A. subfuscus* surprises me indeed.

When Dr. Scharff had seen the specimens he wrote:—"in some measure it approaches *A. lusitanicus* . . . The constrictions, as you remark, are not due to ova actually passing down the oviduct, but they probably did so recently before the specimens were captured. . . . As for the flagellum . . . from a superficial examination, I should be inclined to take it for a strongly contracted muscular mass."

On receipt of his letter I made a further dissection of the oviduct and found the constrictions internally as well. I have never seen a specimen in which the internal wall of the oviduct showed distinct constrictions of the epithelial and muscular layers, and I do not think Dr. Scharff has either—I speak with a tolerably wide acquaintance with the form of this organ in the *Arionidæ* and slugs generally.

As to Dr. Scharff's idea that the flagellum is a portion of the muscle, I purposely dissected the muscle away (*Ann. and Mag.*, 1893, pl. ix., fig. 3,) so as to show the flagellum.

Further differences from *subfuscus* are seen in the form of the receptacular duct, hermaphrodite gland, and in the whole of the generative system.

If Dr. Scharff can show me specimens bred from *A. subfuscus* or any other *Arion*, except this species, in which the general anatomy shows the above features, then *A. flagellus* is not a valid species, but seeing that it is far removed from *subfuscus* and much more closely related to *A. lusitanicus*, I can only regard his criticism as based upon a hasty examination of the specimens in which the salient features were overlooked.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a Red Deer (Stag) from Sir D. Brooke; a Sparrow-hawk from P. Mahony, Esq.; a Canary Finch from T. de Sales, Esq.; two pairs of Jacobin Pigeons, and two pairs of Ring-Doves from G. Patterson, Esq.; and a pair of Guinea-Pigs from J. Fullerton, Esq.
8,550 persons visited the Gardens in October.

DUBLIN MICROSCOPICAL CLUB.

OCTOBER 19th.—The club met at Dr. SCOTT'S, who showed some crystals of cystin under ordinary and polarised light, which were found in a sample of urine submitted to him for analysis. The crystals, which are very easily recognised by their shape (hexagonal plates) and their solubility in ammonia or mineral acids, are interesting from their extreme rarity. Chemically, cystin contains a large proportion of sulphur in rather loose combination, and appears to represent an abnormal method by which the sulphur, set free in protoplasmic metabolism, is eliminated from the body, the normal method being as sulphates of sodium and potassium. The occurrence of these crystals is not uncommonly hereditary, and so far as is at present known is without any clinical import.

DR. E. PERCEVAL WRIGHT exhibited a new species of *Chlorocystis*, which had been described by Miss F. G. Whitting as *C. sarcophyci*. When Mr. Bracebridge Wilson was collecting specimens of *Sarcophycus* off the coast near Peelong he noticed some gall-like structures on the fronds; these were found to be patches of the new endophytic alga. Dr. Wright was indebted to Miss Whitting for a frond from which the section exhibited had been cut. The genus was founded on a species found at Howth, and exhibited to the club by Dr. Wright in 1876.

DR. M'WEENEY showed conjugating filaments of a mucorine fungus—*Sporodinia aspergillus*,—which grows parasitically on dying *Boleti* and agarics. The conidia are produced in sporangia, which are borne at the end of the dichotomously branched hyphæ. The plant under certain circumstances ceases to produce sporangia, the hyphæ become swollen at the tips, and coalescence takes place between the swollen ends of neighbouring hyphæ. A zygospore is thus produced, the outer coat of which becomes warty and opaque—almost black. In this stage the appearance of the whole fungus is so different that its connection with *Sporodinia* was not demonstrated till within a few years ago; the conjugating form was regarded as a distinct species, long known under the name of *Syzygites megalosporus*. This conjugating form does not seem to have been found before in Ireland, and Mr. G. Massee, of Kew, one of the most distinguished English mycologists, informed the exhibitor that he had never met with it, though he had hunted after it for years. A certain amount of interest, therefore, attaches to its discovery at Mrs. White's, Killakee, in September last. Curiously enough, within a few weeks after it was first taken, a fresh specimen was found in a rotting agaric sent by Mr. Praeger from near Gormanstown.

MR. PIM showed *Azolla filiculoides* in fruit. This occurred—so far as is known—this season for the first time in Great Britain, and the first fruits were found in Mr. Walpole's garden at Mount Usher, Co. Wicklow. Subsequently they were met with abundantly in Trinity College Botanic Garden and, doubtless, elsewhere. The species was formerly supposed to be *A. caroliniana* or *pinnata*, but the massulæ, beset with glochidia or hooked processes which have but a single septum near the tip, show clearly that it is the form described and figured in Strasburger's Monograph as *A. filiculoides*. It would be interesting to know if others have observed the fruiting of this pretty little Marsilead.

MR. DUERDEN exhibited specimens of *Tubiclava cornucopia*, Norman, obtained by the Royal Dublin Society's Fishery Survey of 1891 from Blacksod Bay. It is a very rare zoophyte, and is new to Ireland. It has previously been obtained from British waters by Canon Norman, from about twenty miles north of Unst in Scotland, parasitic on *Astarte sulcata* and *Dentalium entalis*; and by Alder from the coast of Northumberland on *D. entalis*. The specimens from Blacksod Bay were obtained from a depth of six to eight fathoms, growing upon *A. sulcata*. There are four of these shells each with the animal inside, and the colony is growing on the posterior extremity of each valve. This is the position *Tubiclava* takes up, as mentioned by Norman for his specimens, so that it will receive the full benefit of the current of water set up by the action of the mollusc. The only other species of this genus is *T. lucerna*, Allman, and this is only known from two localities, one of which is Dublin Bay, and the other Torquay.

MR. HENRY H. DIXON showed karyokinetic figures exhibited by the nuclei of the wall of the archegonium of *Pinus sylvestris*. The number of the chromosomes in these nuclei is greater, as a rule, than those of the other cells of the endosperm (gametophyte) and probably of the oosphere.

MR. A. FRANCIS DIXON exhibited a method of reconstruction from serial microscopic sections. Each section is drawn by a camera lucida and then from the drawings tracings are made on to glass plates. If the drawings are made fifty times enlarged, then glass plates fifty times as thick as the sections are used. Each plate is covered by a thin layer of gum sandarac, which gives a transparent surface very easily drawn on by an ordinary pen. When the plates are placed one on top of another a very good effect is obtained if the whole is seen by transmitted light. This method was first used by Professor His.

MR. D. MCARDLE exhibited the liverwort *Cephalozia catenulata*, Huben, in fruit, which he collected on Bere Island, County Cork. The plant was found in a tuft of *Campylopus fragilis* on the 30th of May last. It is interesting on account of the great diversity of opinion which formerly existed as to its exact relationship. It resembles some forms of *C. bicuspidata*, a common species, from which it may be easily distinguished by its smaller size, tawny colour, greater rigidity of the whole plant, *diacious* inflorescence, *ciliated mouth of the perianth*, the small sub-opaque, closely aerolated leaves, and the absence of flagellæ. The plant has not been reported from the County Cork previously.

BELFAST NATURALISTS' FIELD CLUB.

NOVEMBER 1st.—Social Meeting, which was attended by about 500 members and friends. Immediately after tea, the President (MR. WM. SWANSTON, F.G.S.) opened the proceedings with a few remarks. Later in the evening a short formal meeting was held, at which twenty-four new members were elected. The tables and walls of the Exhibition Hall were crowded with exhibits, among which some of the more interesting were Irish gold ornaments shown by MR. ROBERT DAY; Galway marbles and granites, MR. F. A. PORTER; Lepidoptera of Belfast district, MR. C. W. WATTS; Photographs illustrating Irish ethnography, geology, and birds' nests, MR. R. WELCH; Prize collection of coleoptera, MR. W. D. DONNAN; Prize collection of flowering plants, MISS REA; Aquaria and pond life, MR. JOHN HAMILTON; Ferns, British and exotic, MESSRS. W. H. PHILLIPS and CHARLES M'KIMM; Wood carving, MR. ROBERT MAY. A number of members showed microscopic preparations, and there was a lantern display during the evening.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

NOVEMBER 7th.—MR. L. L. MACASSEY, B.L., C.E., gave a lecture on "The Mourne Water Supply for Belfast."

DUBLIN NATURALISTS' FIELD CLUB.

OCTOBER 7th.—The annual Fungus-Foray was held in Powerscourt Deer-park by kind permission of Lord Powerscourt. Twenty-four members attended, conducted by the President, DR. M'WEENEY. The following species of fungi were collected. The list might have been much longer but that the work of identification devolved altogether upon the conductor: *Agaricus (Amanita) muscarius*, Linn.; *A. (A.) mappa*, Fr.; *A. (Lepiota) terreii*, B. and Br.; *A. (L.) granulatus*, Batsch.; *A. (Armillaria) melleus*, Fl. Dan. (the commonest agaric); *A. (Clitocybe) laccatus*, Scop.; *A. (C.) bellus*, Pers. (small specimen); *A. (Mycena) peltatus*, Fr.; *A. (M.) vitilis*, Fr.; *A. (M.) galopus*, Pers.; *A. (M.) galericulatus*, Scop.; *A. (Omphalia) integrellus*, Pers.; *A. (O.) fibula*, Bull.; *A. (Crepidotus) applanatus*, Pers.; *A. (Naucoria) [close to] conspersus*, Pers.; *Coprinus comatus*, Fr.; *Hygrophorus coccineus*, Fr.; *H. calyptraeformis*, B. and Br.; *Russula ochroleuca*, Fr.; *Marasmius ramealis*, Fr.; *Boletus flavus*, With.; *Gyrodon rubellus*, M'W., nov. sp. [The only specimen found of this interesting new species was sent to Mr. G. Massee, F.L.S., of Kew, to whom Dr. M'Weeny is indebted for a complete description which he hopes soon to publish, together with those of some other new or rare Irish Fungi.]; *Polyporus quercinus* [?] Fr.; *Clavaria cristata*, Pers.; *C. inaequalis*, Fl. Dan. [very common.]; *Pisillaria quisquiliaris*, Fr.; *Tremella mesenterica*, Retz.; *Monilia aurea*, Lk.; *Geoglossum difforme*, Fr. [with a *Verticillium* Sp. not determined growing parasitically on the club.]; *Calloria xanthostigma*, Fr.; *Hymenoscypha pseudotuberosa*, Rehm.; *H. renisporum*, Ellis; *H. bolaris*, Batsch.; *Hypocopra maxima*.

NOVEMBER 14th.—The winter session was most successfully begun by a social meeting attended by over 200 members and friends. The numerous interesting exhibits comprised microscopic fungi and bacteriological cultures, shown by the President, DR. E. J. M'WEENEY; *Geomaculatus maculosus* and *Platyarthrus hoffmanseggii*, shown by DR. SCHARFF; marine algae, shown by PROF. JOHNSON; marine invertebrates and lantern slides of flat-fish development, shown by PROF. HADDON; variolite and other rock specimens and sections, also lantern slides of scenery, shown by PROF. COLE; hydroids and polyzoa, shown by MR. J. E. DUERDEN; rotation of protoplasm in *Chara*, shown by MR. M'ARDLE; rare plants, shown by MR. FRAEGER; insect collections &c., shown by MESSRS. J. M. BROWNE (Hon. Sec.), CUTHBERT, HALBERT, G. H. CARPENTER, and GEO. LOWE; a beautiful series of photographs illustrating Irish ethnology and geology, also lantern slides, by MR. R. WELCH of Belfast; lantern slides of flowers by MR. GREENWOOD PIM; of west of Ireland scenery by DR. C. R. BROWNE and REV. W. S. GREEN; Irish Bats, shown by MR. H. L. JAMESON.

ARMAGH NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

NOVEMBER 13th.—The President, REV. W. F. JOHNSON, M.A., F.E.S., gave his Annual Address. In commenting on the extraordinary summer of this year he remarked that in several cases insects had produced an extra brood, and instanced *Noctua rubi* as having puzzled him by appearing a second time. An account was given of various rare lepidoptera that had appeared in Ireland during the year, noting specially the abundance of *Vanessa atalanta*, and the capture of a specimen of *Pieris daplidice* in County Wexford. This led to mention of the remarkable migratory swarms of insects which have occurred at various times on the Continent and in the British Islands. Attention was drawn to the occurrence of *Chionis alba* at Carlingford as reported in the *Irish Naturalist*, also to Mr. R. L. Praeger's paper on the Flora of Co. Armagh. Coming to matters connected with the Society, the President deplored the loss they had sustained by the deaths of the Rev. G. Robinson, M.A., former President of the Society, and the Lord Primate. A vote of thanks to the President for his address, was moved by Mr. E. L. Fischer, and seconded by Mr. W. G. Robinson. The latter gentleman mentioned that he had seen during the summer *Colias edusa* on the railway embankment near Hamilton's Bawn, and *Vanessa cardui* at Ennislare, near Armagh.

LIMERICK NATURALISTS' FIELD CLUB.

During the past summer several very successful excursions were carried out by this Club to places of interest in the neighbourhood of Limerick, the Committee making use of brakes in preference to railways, and so reaching localities not frequently resorted to. The places selected were Glenstal, Morroe; Mountshannon, Lisnagry; The Deer Park, Adare; Cratloe Woods, Co. Clare; and Curragh Chase, Askeaton. Some interesting botanical and entomological specimens have been obtained by members during the season. The winter meetings of the Club commenced on Tuesday, the 28th November.

NOTES.

BOTANY.

PHANEROGAMS.

Queen's County Plants.—A day in August, spent with Professor Sollas in the neighbourhood of Maryborough, though devoted to geology rather than to botany, was productive of some plants not hitherto on record from that neighbourhood. The species mentioned below were all found within a two-mile radius of Maryborough, and chiefly in the neighbourhood of the fine esker that runs in a north and south direction through the town, and for several miles beyond. The following eighteen plants are, so far as I am aware, additions to the flora of district 3 of "Cybele Hibernica" (Queen's Co., Carlow, and Kilkenny):—*Cardamine sylvatica*, †*Sinapis alba*, *Fumaria pallidiflora*, *Lychnis vespertina*, *Arenaria leptoclados*, †*Prunus cerasus*, **Pastinaca sativa* (well established on the esker), *Thrinchia hirta* (abundant in the neighbourhood), *Salix purpurea*, *S. caprea*, *S. aurita*, *Potamogeton plantagineus*, *Schœnus nigricans*, *Carex remota*, *Phalaris arundinacea*, *Nardus stricta*, *Schlerochloa rigida*, *Lycopodium selaginoides*. Of other plants, the following may be mentioned:—*Erigeron acris*, *Solidago virgaurea*, *Galeopsis ladunum* were most abundant on the gravels of the esker; with them grew *Matricaria chamomilla*. Close to Maryborough *Ballota nigra* and *Salix pentandra* were observed; *Equisetum wilsoni* grew by the edge of a stream a mile south of the town; and in bog drains near the latter spot were *Utricularia vulgaris*, *Sparganium minimum*, *Lemna trisulca*. Additional species noted were *Ononis arvensis*, *Rosa arvensis*, *Antennaria dioica*, *Leontodon hispidum*, *Carlina vulgaris*, *Parnassia palustris*, *Chlora perfoliata*, *Gentiana amarella*, *Lithospermum officinale*, *Lamium amplexicaule*, *Origanum vulgare*, *Carex riparia*, *Ceterach officinarum*.

A day's botanizing between Monasterevan and Portarlington, on the borders of Queen's County and Kildare (districts 3 and 5) adds one or two plants to the present note. *Enanthe fistulosa*, *Sium angustifolium*, and *Eleocharis acicularis* (see I.N., Oct., 1893), grow in the canal in both counties. *Sagittaria sagittifolia* and *Veronica buxbaumii*, seen near Portarlington, are new to district 3. *Malva rotundifolia*, *Verbena officinalis*, *Origanum vulgare*, *Ballota nigra*, *Lychnis vespertina*, *Erigeron acris*, grow at Monasterevan, in Kildare. *Mentha piperata* and *Aquilegia vulgaris* were seen on a bog on the Kildare side, far removed from any cottage or cultivated ground.—R. LLOYD PRAEGER.

Strawberries in November.—At the conversazione of the Belfast Naturalists' Field Club, held on 1st November, a well-known member added to his popularity by passing round among his friends a basket of ripe strawberries, one of fifty 1lb.-baskets sent that day to Belfast for sale. The fruit were grown in the open air at Loughgall, Co. Armagh; they were perfectly ripe and of excellent flavour. On 7th November a second instalment of 24 baskets, even superior to the first, arrived in Belfast from the same place.—R. LLOYD PRAEGER.

Erica mediterranea flowering in October.—From Achill Island Mr. J. R. Sheridan has sent me a few branches of *Erica mediterranea*, which he found flowering at the very unusual date of 10th October, and he remarks that it had been out for a week or two previously. This is, no doubt, a result of the extraordinary fine and hot summer which we have experienced this year, and which has caused many other spring-flowering plants to anticipate their usual date.—A. G. MORE, Dublin.

Autumn Blossoming of Spring Flowers.—In the notice on this subject in the last number of the *Irish Nat.*, Mr. Praeger includes *Mertensia maritima*. According to the "Cybele Hibernica" it flowers from "May to August," and Babington's "Manual" gives June to August. As far as my experience goes, it flowers the whole summer, and I have gathered it in flower in September ten years ago at the station (Malin Head) cited by Mr. Praeger. In this mild district we have always early-flowering species re-appearing in a desultory fashion in November and December. The most remarkable instance I notice at present is that of the Hazel, which is now in blossom, its usual season being February to March. But I have seen it last year flowering in December. Ivy has been in bloom since August. It is in the garden, however, that abnormal flowering is most conspicuous at present. Many instances have been noted in the columns of the various horticultural papers. In my garden Tazetta Narcissi have their buds formed and the colour already showing. Another sort that I am not sure of has its buds formed. All sorts have their leaves above ground, four inches to a foot or more in height. Numerous other alarming growths are occurring, chiefly amongst bulbs.—H. C. HART, Carrablagh, Co. Donegal.

ZOOLOGY.

S P O N G E S.

Spongilla lacustris at Ballyshannon.—On October 22nd I collected some *Spongilla* in Columbkille Lough, near Ballyshannon, and sent it to Dr. Scharff for identification. He writes me:—"I am very glad to get the fresh-water sponges at the present time of year, as the ovaries are now developed, which form an easy means of determination. The ordinary spicules are almost worthless in that respect. There are two groups of fresh-water sponges, the *fluvialilis* and the *lacustris* group. Numerous varieties, by some regarded as species, have been described of each. The absence of amphidiscs in the covering of the ovaries characterises the *lacustris* group, while the other has them. They are disc-shaped silicious structures united by a rod. I could not find any of them in your specimens, and would not hesitate, therefore, to call them *S. lacustris*." Possibly this locality may be worth recording, as from Dr. Scharff's note in *I. N.* for October, *S. lacustris* appears not to have been recorded from N. of Ireland.—R. H. CREIGHTON, Ballyshannon.

I N S E C T S.

Pieris daplidice, L. in Ireland.—I beg to record the occurrence of the "Bath White" butterfly in this district during the present month. I showed the specimen to Mr. Pearce, of Romsey, Southampton, and to Mr. Gore Cuthbert of Dublin, who confirmed my identification.—N. S. HIND, Ferns, Co. Wexford.

Lepidoptera at Howth and Castlebellingham.—In going over a very interesting collection of Lepidoptera made this year at Castlebellingham by Mr. W. B. Thornhill, I found three specimens of *Aplecta advena*; also a nice series of *Apamea fibrosa* and *leucostigma*, *Agrotis lunigera*, *Plusia bractea*, and *Zanclognatha tarsipennalis*. Mr. Thornhill had also taken some curious forms of *Hydrocampa nymphaea* and *H. stagnata*. The occurrence of *A. lunigera* struck me as surprising, but Mr. Thornhill informs me that his garden is within a mile of the sea.

At Howth this year a few insects, unrecorded, I think; for the locality, turned up; other old inhabitants altered their times of appearance, and, I regret to say, many old friends were not observed at all.

In March, while collecting *Larentia multistrigaria* and larvæ of *Epunda lichenea*, I took *Xylocampa areola*; on the 27th April *Cucullia chamomille* over flowers of *Narcissus poeticus*. In the first week of May several *Hadena glauca* and *Teniocampa rubiginosa* were taken by Mr. M'Carron, the keeper of the Bailey Lighthouse; also *Agrotis lunigera* and *A. lucerneæ*, showing how early the season was. During the months of May, June, and July *Dianthia capophila* was as plentiful as usual, but *D. barrettii* was extremely scarce; the only specimen I succeeded in taking was a dwarf. In July *Triphena fimbria* was abundant and *Calymnia trapezina* not uncommon. On July 11th one *C. affinis* was taken at sugar. On the 24th July one *Hadena suasa* at Ragwort, at Portmarnock, with some specimens of *Apamea leucostigma*; many *Agrotis tritici*, etc., etc.

In August *Charaxes graminis* came in great numbers to the light at the Bailey. Mr. M'Carron found the glass covered with these insects, constantly coming against it in such quantities as to resemble a heavy snow-storm. Small birds were observed in the lamplight flying among the insects, and apparently having a good time. Some beautiful varieties of *C. graminis* were taken.

On the 18th August *Agrotis saucia* appeared at sugar. This insect was unusually abundant in the following month.

In September about half-a-dozen *E. lichenea* emerged from larvæ taken here in the early spring. They are not satisfactory specimens, being almost destitute of the beautiful green colour generally shown. A few that were captured seemed to be also duller than usual.

The later season was very unproductive. The Ivy was in good bloom but attracted few insects if *Xanthia circellaris* and *Miselia oxyacantha* be excepted. On the 3rd October one *Xylina ornithopus* appeared in the neighbourhood of sugar.

During the season from April to October *Macroglossa stellatarum* was on the wing. *Argynnis paphia* showed at Howth for the first time since I came. The whites were in immense numbers to the destruction of cabbages and cauliflowers. *Vanessa atalanta* was abundant. A good bush of broad-leaved Privet with a dozen or so of these butterflies sucking at the flowers is better than a garden of scarlet geraniums. I did not observe *V. io* at all which was unsatisfactory after discharging so many larvæ the year before last. I was in hopes that it might become naturalised at Howth, but whether our nettles are less nutritious than those at Marlborough, or the climate less suitable to the butterfly, or whatever may have been the cause, I fear the attempt has been a failure.—G. V. HART, Howth.

Macroglossa stellatarum in Co. Sligo.—A specimen of this moth captured at Ballymote, Co. Sligo, was forwarded to me on 23rd October. The moth was alive when received.—H. LYSTER JAMESON, Killincoole.

BIRDS.

Western Variety of the Red-breasted Snipe in Ireland.—Through the kindness of Professor Newton, of Magdalene College, Cambridge, I have had the opportunity of examining an Irish example of the western variety of the Red-breasted Snipe (*Macrorhamphus griseus* var. *scolopaceus*). This bird was sent to Professor Newton by Mr. F. Coburn, taxidermist, of 7, Holloway Head, Birmingham, who noticed that the measurements of the wing, culmen, and tarsus seem to point rather to the Western than the Eastern form. Mr. Coburn writes:—"The bird was received from Tipperary, Ireland, on the 11th instant, with a bundle of Common Snipe, and judging by its perfectly fresh condition could not have been killed more than two or three days. Its body was in excellent

condition, in fact quite fat. The bill has shrunk very much in the drying, when fresh it was thicker-looking, and the end so widened out that it was quite spoon-shaped, and hollowed inside." This form of *Macrorhamphus* has not hitherto been recorded for Europe, but it is very doubtful if it is even of subspecific value. The two forms *griseus* and *scolopaceus* cannot be distinguished by their plumage, and even the more reliable measurements of bill, tarsus, and wing appear to completely intergrade, as shown by a series of examples in the Museum of Cambridge University. Thus a specimen procured by Mr. Kendall at Great Bear Lake measures only—bill, 2 in., tarsus 1·3 in., wing, 5·7 in., whereas a specimen obtained at York Factory measures—bill, 2·95 in., tarsus, 1·5 in., wing, 5·9 in., in fact it was the largest bird of the series examined. Mr. Coburn's specimen measures—bill, 2·65 in., tarsus, 1·6 in., wing, 6 in.—G. E. H. BARRETT-HAMILTON, Trinity College, Cambridge.

Sabine's Snipe—A Correction.—I have just had a letter from my friend, Mr. Arthur Brooke, of Killybegs, informing me that the Sabine's Snipe (dark form of Common Snipe) mentioned in the last issue of the *Irish Naturalist* as having been shot in Co. Tyrone, was shot, as a matter of fact, on the mountains near Bonny Glen, Inver, Co. Donegal, by Mr. R. W. Peebles.—H. C. HART, Carrablagh, Co. Donegal.

Night-Heron (*Nycticorax griseus*), near Belfast.—I have recently had the pleasure of examining in the flesh a Night-Heron. It was shot on the evening of the 26th October on that piece of waste land just outside Belfast known as the "People's Park." In the moonlight the gentleman who shot it mistook it for an owl by its flight, which he describes as slow and lazy. It is a young bird in the beautiful spotted plumage; sex not ascertained. To Ireland it is a very rare visitor, Mr. More stating that only ten or twelve occurrences are known. This specimen has been most naturally mounted by Mr. Sheals.—ROBERT PATTERSON, Malone Park, Belfast.

Little Auk (*Mergulus alle*) in Belfast.—On November 8th a bird which had been picked up alive in the yard of a house in the middle of Belfast, was brought to me for identification. It was a Little Auk in winter plumage and quite uninjured. The species is very rarely seen here.—ROBERT PATTERSON, Malone Park, Belfast.

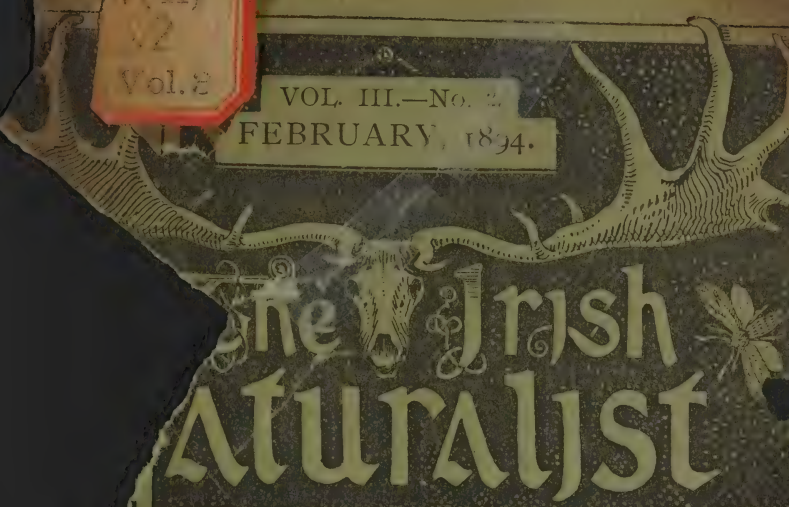
MAMMALS.

Squirrels in Ireland.—I wish to draw attention of readers of the *Irish Naturalist* to the remarkable increase of squirrels in Ireland. Localities in which they were quite unknown a few years ago are now plentifully stocked and will soon, doubtless, send off colonies to occupy neighbourhoods that are yet unmolested. Demesnes in this locality, such as Brittas, Aclare and Whitewood, in which, to my own knowledge, they were quite unknown, have, within the last two or three years, become a favourite haunt of these animals. During a late excursion to the famous abbey and ruins at Bective in this county, I was highly amused by the surprising agility of the squirrels. One, as if to show off his acrobatic ability, kept pace with our horse by skipping along from twig to twig on top of the hedgerow, along the roadway; while another, more grown, sat making up his toilet on the topmost spray of a well-grown beech, unmindful of the swinging of the bough in a soft summer breeze. Bective and Clady, with all their historic and prehistoric associations, just required this last touch (a little mammalian life in the picture) to make the scene truly exquisite. And yet, I was told by our "jarvey" that plentiful as squirrels are now, about Clady, a few years ago they were quite unknown around there. "They came," he said, "and no one knew how." Probably from about Dublin, where, I believe, the woods have been inhabited for many years.—OWEN SMITH, Nobber, Co. Meath,



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The Irish Naturalist

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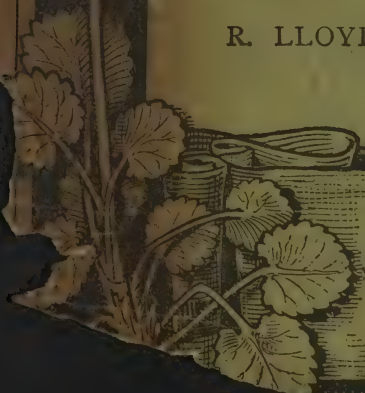
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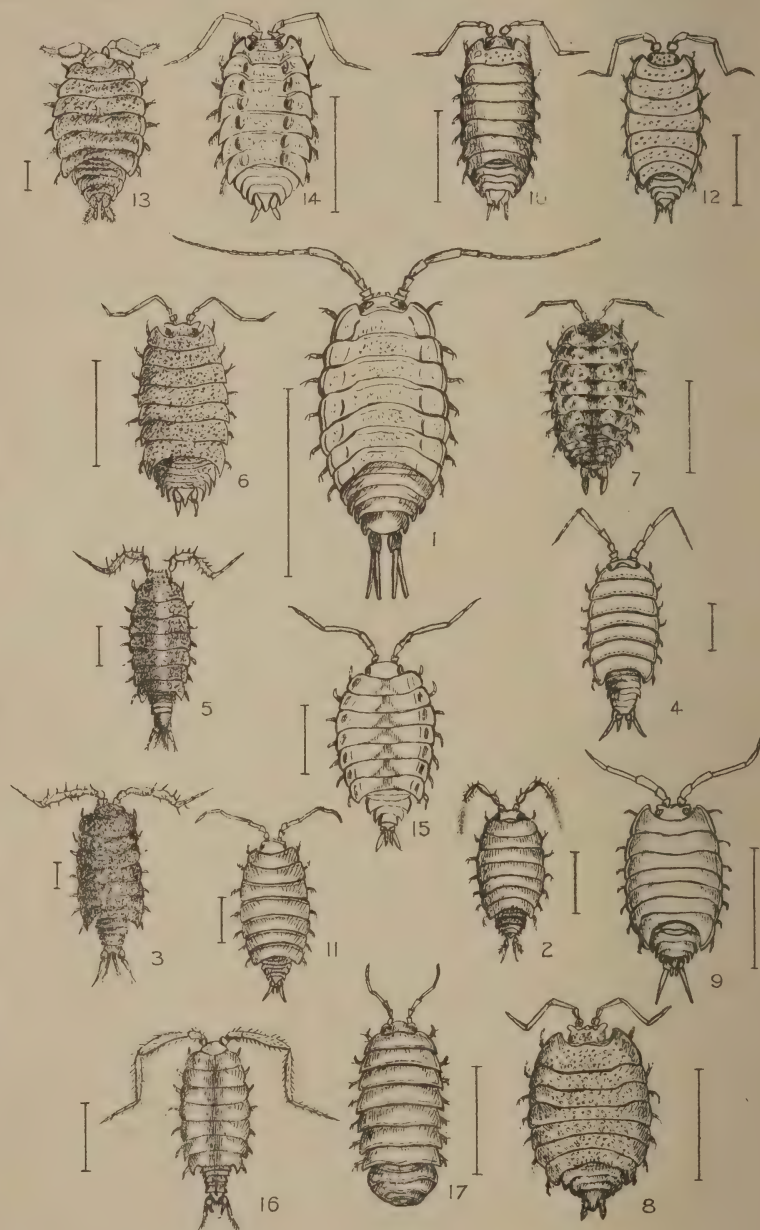
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THE BRITISH WOODLICE.

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FEBRUARY, 1894.

No. 2.

THE IRISH WOOD-LICE.

(WITH DESCRIPTIONS AND FIGURES OF ALL THE BRITISH SPECIES.)

BY R. F. SCHARFF, Ph.D., B.Sc.

[PLATE 2.]

(Concluded from page 7.)

LIGIIDÆ.

Ligia oceanica, L. (fig. 1).

This is the largest of the Irish Wood-lice. It differs so much from all others that it is not easily mistaken. The outer antennæ are about two-thirds of the length of the entire animal, and their last joint, the flagellum, as it is called, has 11-13 articulations. In no other Irish species except the next has the flagellum more than 10. The tail or caudal appendages are long and tapering (filiform) and of about equal length. The general body-colour is of a greyish-green.

This species is common under stones between tide-marks only, never occurring inland. I have taken it along the east coast and also on the west at Glengariff and Castletown-Berehaven. Mr. Jameson obtained it at Bundoran.

GENERAL DISTRIBUTION.—Common on the English (1)¹, and Scotch coast (8), and indeed along the whole west coast of Europe as far south as Gibraltar and even Malaga (2). In the Mediterranean proper it is replaced by the allied species *Ligia italica*.

[*Ligidium hypnorum*, Cuv.] (fig. 2).

L. Personii, Kin.

L. agile, Norman.

The figure unfortunately does not very clearly show the 10 (sometimes 13) articulations in the flagellum or last joint of the outer antennæ. As none of the species mentioned hereafter have more than seven divisions in the flagellum, this character alone suffices to distinguish *Ligidium hypnorum* from them. The size of this species and structure of the caudal appendages separate it from *Ligia oceanica*.

It has not been found in Ireland.

GENERAL DISTRIBUTION.—South-east of England (11), Western Europe and Turkey (2).

¹ The numbers refer to the works enumerated on p. 7.

Trichoniscus pusillus, Brandt (fig. 3).*Philougria riparia*, Kin.

This is the smallest of the Irish species, a full-grown specimen measuring only $3\frac{1}{2}$ mills. in length. It is of a claret-brown colour, smooth and shining in texture, and dotted over with exceedingly minute white spots. The outer antennæ are a trifle too long and broad in my figure; three or four articulations make up the flagellum. As in the other species of the genus, the tail is very distinctly narrower than the body. The last caudal segment is deeply excavated over the insertion of the posterior appendages. *Trichoniscus pusillus* is found only in very damp places amongst moist leaves and under stones, and it runs with great agility.

It is a very common species throughout Ireland.

GENERAL DISTRIBUTION.—Widely distributed in England (1), and Scotland (9), W., N., and Central Europe, Algeria and N. America (2).

Trichoniscus vividus, Koch (fig. 4).*Philougria vivida*, Kin.

In colour and texture this species agrees almost precisely with the last, but it is about double the size, and the flagellum has 5-7 articulations, instead of 3-4 in the other. The outer antennæ are also devoid of the hairs or setæ by which the other two species of *Trichoniscus* are distinguished, and the last caudal segment is not excavated (emarginate).

This species has been taken under stones on the hills at Portlaw, Co. Waterford (5), the only locality in the British Islands.

GENERAL DISTRIBUTION.—France (2).

Trichoniscus roseus, Koch (fig. 5).*Philougria rosea*, Kin.

A beautiful light vermilion colour, with a pale yellow stripe down its back, distinguishes this species at once from all other British Wood-lice. Occasionally perfectly white specimens are found, and in spirit they all turn white.

This species has not been recorded by Kinahan. I found it plentifully in my own garden in Dublin among damp cinders in autumn; and I have, quite recently, received from Mr. R. Welch a box-full of clay from Ballyfinder, Co. Down, in the crevices of which I found an example of this very rare species.

GENERAL DISTRIBUTION.—Plymouth in England (1), W. and C. Europe, Italy, Dalmatia, Algeria (2), New Zealand (10).

ONISCIDÆ.**Porcellio scaber**, Latr. (fig. 6).

This and *Oniscus asellus* are the two commonest species in Ireland, and they principally do the damage to tender shoots in the greenhouse. The colour is generally of a uniform grey-slate, but numerous varieties occur, some being irregularly dotted with yellow; in others yellow becomes the prevailing colour. The strongly-marked tubercles, covering the whole of the back, are the most conspicuous feature. The flagellum, as in other species of this genus, has only two joints, and they are about equal in length in *Porcellio scaber*.

It is common everywhere in Ireland in damp as well as in moderately dry situations.

GENERAL DISTRIBUTION.—Common in England (1), and Scotland (9), N. and C. Europe, N. America, Greenland and Cape of Good Hope (2).

Porcellio pictus, Brandt (fig. 7).

In size this species differs but little from the preceding one, and although it bears a certain resemblance to some of the spotted forms of *P. scaber*, the general colouring distinguishes it at once from all other species. The head is entirely black, and the black and yellow markings on the body are arranged in regular rows. It is also much less granulated than the last species.

It is one of the rarest of the Irish species, having only been found in Dublin and Belfast (5) in rather dry localities among stone rubbish.

GENERAL DISTRIBUTION.—England (Kent only) (1), N., W., C. & E. Europe and N. America (2).

Porcellio dilatatus, Brandt (fig. 8).

This species is generally slightly larger and much broader than *P. scaber*, and the outer antennæ are a little shorter. The terminal caudal segment is rounded at the tip, not pointed as in *P. scaber*. The colour is grey, rather similar to that of the latter species, but it has a longitudinal series of white tubercles arranged down the middle of the back, and the surface is less strongly granulated.

It is extremely rare in Ireland, and has been found only in Dublin (5) along with *P. scaber*. It has not been recorded from England. Abroad it lives chiefly in cellars.

GENERAL DISTRIBUTION.—C. and W. Europe, and Cape York, (Australia) (2).

Porcellio laevis, Latr. (fig. 9).

The very smooth and shining surface of the back distinguishes this species at once from the three preceding species of *Porcellio*. It is larger too than any of the others, and the caudal appendages are of great length. There are often two series of yellowish markings arranged longitudinally along the back, and the under side of the body and legs are yellow. The terminal segment of the tail is triangular and shorter than in the other species. The colour is greyish-purple.

Like the last, it is a rare species, having been found only in Dublin among stable-litter and at the foot of old walls (5).

GENERAL DISTRIBUTION.—S.E. of England only (1), C., W., and E. Europe, Mediterranean Islands, Turkey, Turkestan, W. Indian Islands, N. and S. America, &c. (2).

Cylisticus convexus, De Geer (fig. 10).*Porcellio armadilloides*, Kin.

In shape, this species reminds one strongly of *Armadillidium vulgare* (fig. 17), and like the latter, it is able to roll itself into an almost perfect ball, which quality is possessed by none of the other Irish Wood-lice to the same degree, although some of them make an attempt at rolling themselves up partially. The upper surface of the body is very convex and shining, of an iron-grey colour, with a row of ill-defined whitish spots parallel with the lateral margins. The caudal appendages are styliform, as in all other species of the genus.

Prof. Kinahan does not record this species from Ireland, and I myself only recently discovered it under stones in a disused quarry at Leixlip, County Dublin. It runs with great agility.

GENERAL DISTRIBUTION.—S. E. England only (1), Scotland (9), N. C., and E. Europe, Turkey, N. America,

Metoponorthus cingendus, Kin. (fig. 11).*Porcellio cingendus*, Kin.*Metoponorthus simplex*, B.-L.

The narrow segments of the tail distinguish this species and the next from those of the genus *Porcellio*. In this respect they resemble the species of *Trichontiscus*, but the tail is never so long as in the latter, and the structure of the antennæ also is different. The colour of this species is rather striking, being of a steel blue with red or yellowish spots. It runs with great rapidity, and never attempts to roll itself into a ball. One of the most salient features is the transverse raised line on the anterior portion of each body-segment.

It has not been taken in England, but in the mountainous districts of Dublin, Wicklow, and Cork, and also on the coast of Kerry, and on the Aran Islands, it is common.

GENERAL DISTRIBUTION.—France (2).

Metoponorthus pruinus, Brandt (fig. 12).*Porcellio pruinus*, Kin.

The segments of the tail are rather wider than in the last species, and in this respect *M. pruinus* approaches the *Porcellios*, but is still sufficiently distinguished from them. The surface of the body is more rough and granular than in the preceding one, and the general body-colour is of a uniform reddish-brown, often dotted with white spots.

I cannot agree with Prof. Kinahan that it is common in Ireland; it certainly is quite absent from the mountainous districts, and has only been taken in the neighbourhood of Dublin. It often buries itself in the ground.

GENERAL DISTRIBUTION.—S. E. England only (1), Banff in Scotland (9), chiefly S. and W. Europe, but also in the East; N. and S. America, N. Africa, Sumatra and Madagascar (2.)

Platyarthrus Hoffmansseggii, Brandt (fig. 13.)

I have already mentioned the fact that this species inhabits ants' nests, and is devoid of eyes. It is perfectly white in colour. Moreover, the short flattened antennæ and the small size distinguish it at once from all other Irish Wood-lice. The body-surface is strongly granulated.

The species is new to Ireland. I discovered it first at Leixlip, County Dublin, and since then at Lismore, County Waterford, and Glengariff, County Cork.

GENERAL DISTRIBUTION.—S. England (1), Banff, Scotland (9), C. and W. Europe (2).

Oniscus asellus, L. (fig. 14.)*Oniscus murarius*, Cuvier.*O. fossor*, Kin.

Of all the Irish Wood-lice this is by far the commonest. It was formerly used in medicine, and was supposed to cure consumption and other diseases. The general colour is of a light grey, but it varies from that to light brown and dark grey, and it is marked with patches of yellowish white, especially along the margins of the body-segments. The body-surface is glossy, and furnished with raised tubercles. The three articulations in the flagellum of the outer antennæ distinguish it at once from any of the species of *Porcellio*.

It occurs in damp as well as in dry situations, especially under bark of fallen trees and under stones everywhere. I recently submitted specimens of Prof. Kinahan's *Oniscus fossor* to Prof. Budde-Lund, who failed to recognize any specific distinction between it and this species. The young of *O. asellus* appear always to be less glossy than adults, and of a more uniformly grey colour.

GENERAL DISTRIBUTION.—Throughout England and Scotland (1), almost throughout Europe, Azores, and North America (2.)

Philoscia muscorum, Scop. (fig. 15).

The species of the genus *Philoscia* have the narrow tail in common with *Trichoniscus* and *Metoponorthus*, but differ from them in the structure of the flagellum, which has three joints, whilst there are only two in *Metoponorthus*, and generally more than three in *Trichoniscus*. If there should be any doubt between *Philoscia muscorum* and *M. pruinus* (to which it bears a certain resemblance in size and shape), the very glossy surface of the body and the dark markings along the middle of the back will distinguish the former from the more dull and uniformly coloured *M. pruinus*. The colour of these species varies very considerably, from red to reddish-brown and black. It is extremely common, having been obtained in almost every part of Ireland, chiefly in woods under stones and leaves.

GENERAL DISTRIBUTION.—S. England (1), Scotland (9), C., W. and S. Europe, and N. Africa (2.)

[Philoscia Couchii, Kin.], (fig. 16.)

Philoscia longicornis, Budde-Lund (fide Dollfus).

This species, like the last, is very smooth and shining, but it differs in being rather smaller, and in the outer antennæ being of greater length and hairy. Its colour too, which is a uniform pale grey, distinguishes the species from the preceding one.

It has not yet been found in Ireland.

GENERAL DISTRIBUTION.—S. W. England (6), the shores surrounding the Mediterranean (2).

ARMADILLIDÆ.**Armadillidium vulgare**, Lat. (fig. 17.)

Armadillo vulgaris, Kin.

As I have mentioned before, this is the only Irish Wood-louse in which the caudal appendages do not project posteriorly, and in virtue of their truncated shape it is able to roll itself into a perfect ball at the least alarm. It is known as the "pill millepede" along with a real millepede (*Glomeris*) which has the same faculty of rolling itself into a ball. Formerly it was in great repute for its supposed medicinal virtues, and when dried and pulverized it was spoken of very highly as a remedy for indigestion, and even weakness of sight. It is very convex and shining, and varies in colour from dark steel-grey to reddish-brown, and in the amount of its pale markings.

In Ireland it is more common in the plain than in the mountains, and it has not yet been taken on the west coast.

GENERAL DISTRIBUTION.—England (1), Scotland (9), the greater part of Europe, and the adjoining portions of Asia and Africa. (Monte-Video, New York, Melbourne—introduced ?) (2).

A PLEA FOR IRISH GLACIOLOGY.

BY MISS S. M. THOMPSON.

ARE we to have another Great Ice Age? If so, when? Or are we to consider that some unexplained and catastrophic reason caused the glaciation whose traces are to be found almost everywhere over the surface of our continent? These questions are agitating the minds of geologists at present, and the diversity of answers given may be assumed to indicate the insufficiency of the evidence as yet accumulated to settle the points in question. Perhaps rarely have so many different opinions been held simultaneously by men well qualified to pronounce judgment upon any special subject, as upon the date, conditions, causes, and possible recurrence of an Ice Age; and the recent suggestion, that its date was not as remote as supposed, has added zest to investigations into ice-action and its traces. Some, who had carefully studied the subject in former years, may wish to verify their previous conclusions, and retain or modify them according to the results obtained; whilst others may be tempted by the interest of a subject so fully illustrated in every journey they take, in every new spot visited (at least in Ireland), to enrol themselves in the army of patient accurate observers, whose systematic work is needed to accumulate the mass of evidence required before any final and satisfactory theory can be formulated by the master-minds of our day.

Just a hundred years have elapsed since the strife between the Plutonists and Neptunists was raging in Edinburgh, whilst William Smith was patiently and laboriously accumulating the observations upon which stratigraphical geology was founded. Nearly half a century was to pass before the chilly suggestion of a glacial period came to clear up many vexed questions, and explain many strange deposits; and within the last few years astronomers and physicists have claimed permission to theorize upon the subject; and Dr. James Croll has given to the world the wonderful conception of regularly recurring glacial periods¹, depending upon the relative positions of our sun and earth. Who can tell what additions to our knowledge the next few years may bring, under the stimulat-

¹ J. Croll—"Climate and Time, in their Geological Relations;" London, 1875.

ing influence of the New Geology? Those who have listened to Sir Robert Ball's eloquent description of the precession of the equinoxes, and the periodic eccentricity of the earth's orbit, the "breathing in and out" of that mighty ellipse, will realize more clearly the astronomical side of the question, and more readily believe that there may have been and may be other glacial epochs. Some interesting facts in connection with this view are given by Dr. James Geikie in a recent paper on the evolution of climate¹, where he mentions that erratics have been found in Cambro-Silurian rocks as much as five feet in diameter; and he quotes Sir William Dawson's account of a large Carboniferous esker with erratics, and says that Sir Andrew Ramsay believed he discerned ice-action in the Permian breccias, and in erratics included in the Palæozoic strata of Scotland. Unfortunately, we are not likely to obtain much information about those possible early glacial periods, but surely we cannot rest content without investigating to the utmost degree everything that speaks of what we must still term *par excellence* The Great Ice Age?

Splendid work upon the glaciation of Ireland has been already done by the Rev. Maxwell Close², who has not only given the fruits of years of careful study on his own part, including a map showing the direction of the ice striations, but has also brought together much work done by others, especially by the officers of the Geological Survey of Ireland. Those who wish to familiarize themselves with much that has been already written upon the subject, should refer to Professor Hull's "Physical Geology and Geography of Ireland"³, which contains a list of works on Irish geology in which papers on glacial subjects by Mr. Kinahan⁴ and other writers are quoted, and which is also furnished with an interesting map showing the general direction of ice striæ in Ireland; whilst for local work, the maps and explanatory memoirs of the Geological Survey afford valuable and convenient assistance. Readers of the *Irish Naturalist* will not require to be reminded of Professor

¹ James Geikie—"Fragments of Earth Lore," 1893.

² M. H. Close—"On the General Glaciation of the Rocks near Dublin," *Jour. Roy. Geol. Soc. Ireland*, vol. i., p. 3; "On the General Glaciation of Ireland," *Ibid.*, p. 207; "The Elevated Shell-bearing Gravels near Dublin," *Ibid.*, iv., p. 36, and *Geol. Mag.*, 1874, p. 193; &c.

³ Hull—"Physical Geology and Geography of Ireland," London, 1878.

⁴ See also Mr. Kinahan's "Geology of Ireland."

Cole's "County Dublin, Past and Present," which appeared in the first five numbers of this magazine¹, and contains an interesting discussion on glacial phenomena; and in last month's issue we have enjoyed some very recent information from Professor Sollas, referring to glacial investigations which he is at present engaged upon, in conjunction with Mr. R. Lloyd Praeger, Hon. Sec. of the Dublin Naturalists' Field Club.

Last summer, a communication from Mr. Percy F. Kendall, F.G.S., Secretary to the Erratic Blocks Committee of the British Association, was received by the Belfast Naturalists' Field Club, urging them to commence systematic investigations into the glaciation of the north-east of Ireland, especially with regard to erratics and other stones included in the drift. In response to Mr. Kendall's request, a sub-committee "to investigate the glacial phenomena of the district" was appointed in August last, and work was immediately commenced. Glacial inquiry is, however, not a new departure in the Club, as in its Report for 1879-80, a paper by Mr. Joseph Wright, F.G.S., upon the Post-tertiary Foraminifera of the north-east of Ireland contains a table showing their distribution in the boulder clay of that district, and in the gravels at Balcaddan Bay, Ballybrack, and Ballyedmonduff, in the vicinity of Dublin. The same Report also contains a paper by Mr. S. A. Stewart, F.B.S.E., giving a list of the Mollusca of the north-eastern boulder clay, and the Report for 1892-93 gives a list of both Mollusca and Foraminifera collected during a recent investigation of the Ballyrudder gravels near Glenarm. But the inquiries now initiated deal more particularly with the stones included in glacial deposits, and the measurement and recording of the larger erratic boulders. Mr. Kendall tells me that in the twenty-two years of the Erratic Blocks Committee's existence no report has been received from Ireland! Surely we may hope that Mr. Kendall's reproach may be wiped away during the coming year, and that Irish geologists will undertake a united, systematic, and prolonged attack upon the icy problems that lie awaiting the investigator and observer.

In a pamphlet written by Professor Sollas with reference to the visit of the Geologists' Association to Dublin in July last²,

¹ *Irish Nat.* 1892.

² W. J. Sollas—"The Geology of Dublin and its neighbourhood," *Proc. Geol. Ass.*, 1893.

he mentions that he is studying the stones found in glacial deposits, in conjunction with Mr. Pomeroy of Trinity College, Dublin, and he has since commenced the other glacial inquiries already referred to. There are other scientific societies and clubs in Ireland, as well as many isolated observers, no doubt able and willing to help the movement, and as the work would be more valuable and more easily correlated with the glaciology of other countries if carried out on a somewhat uniform method, it may be worth while to draw attention to the little handbook published by the Glacialists' Association¹, giving an outline of the work suggested, which can easily be modified to suit local requirements.

In Belfast we have commenced to form a type collection of stones from our glacial deposits, carefully labelling each specimen with the locality where it was found, and intend ultimately to appeal to experts in petrology to assign to unknown foreign rocks their parent locality. The height above sea-level of each deposit is also being recorded, and general features of the surrounding landscape. In addition to this, we are tabulating the percentages of different rocks occurring in each bed, taking 100 stones at random, large and small, and noting the number of each rock found; this is yielding interesting results. Photographs and sketches of the sections examined are obtained if possible. A bag of the matrix, be it clay, sand, or gravel, is also brought away for chemical and mechanical analysis, and also for the very important and necessary search for minute organic remains, which has yielded in the north such marked and striking evidence of the marine character of the glacial deposits as to make the belief in a submergence almost if not quite universal among local geologists. The value of this biological evidence cannot be too strongly insisted upon, as not only dealing with the supposed submergence, but also as affecting the question of milder interglacial periods. In the paper previously referred to, Mr. Stewart writes that—"the "so-called interglacial gravels seem to be only local deposits "of one continuous period, during which arctic or semi-arctic "conditions prevailed over this country without any interval "of relaxation"; and that "the sands and gravels at Bally-

¹ Hints for the Guidance of Observers of Glacial Geology, by Percy F. Kendall, F.G.S. To be obtained from the Assistant Secretary, 19, Seaton Buildings, Water-street, Liverpool. Price One Shilling.

"rudder, which Professor Hull regards as interglacial, yield "abundant specimens of a fauna as arctic in character as any "portion of the boulder clay." It is interesting also to find that such a fragile shell as *Leda pygmaea* is frequently found in the boulder clay in a perfect state, with valves united, and that in spite of the great number of shell fragments, perfect specimens are frequently found under such conditions as preclude the idea of transportation or re-deposition.

The search for "foreign" rocks in the deposits is in itself of surpassing interest, and the glacial geologist spends many delightful hours in this exciting pursuit. We are watching keenly for Scottish fragments, especially for the unique Ailsa Craig eurite, which has been found at Greenore and Killiney by Professor Cole, and at Greystones by Professor Sollas. It is, however, possible that as the coalescence of British and Scandinavian ice in the North Sea allowed Scandinavian erratics to be found in Yorkshire and southwards, but not, as yet, in Scotland, so the supposed meeting of Scotch and Irish ice-sheets in the Irish Sea may have shunted the Scottish stream south-eastwards, so that fragments from Ailsa may not have reached our district—a suggestion which their presence in the Moel Tryfaen deposits seems to favour; it is one of the problems of modern glacial geology to account satisfactorily for the transport of these fragments from their parent rock to their Welsh resting-place, fully a thousand feet higher.

Remembering that where we now find the greatest rainfall, the glacial period was also most severe, we see in Ireland an admirable field for inquiry, and in the *Irish Naturalist* a valuable medium for recording and publishing the results obtained. Nor can we doubt that from lack of such a publication in former times facts remained unrecorded, and important observations were lost to science (we must earnestly hope not irretrievably), that may now be given to its readers. Many unpublished glacial observations must exist that were made incidentally by members of the Geological Survey, as well as by individual geologists, perhaps working at other questions, which we may surely hope to see gradually collected in these pages, so that our Irish magazine may be the means of contributing to the scientific world valuable information, and casting new light upon the, as yet, unsolved problems of Glacial Geology.

NOTES ON THE FLORA OF THE NORTH-EAST OF IRELAND.

BY SAMUEL A. STEWART, F.B.S. EDIN.

By the preparation and publication of the "Flora of the North-east of Ireland,"¹ in 1888, our knowledge of the native vegetation of the three north-eastern counties of Ireland was summarised to that date. That Flora, while focussing the hitherto scattered researches of our local botanists, also served another and a valuable purpose. It has had the effect of stimulating the zeal of the younger naturalists. It has shown them wherein our knowledge of plant-distribution in the district was defective, and has led them, more or less, to systematize their work so as to remedy these defects, and to strive to fill up the remaining gaps.

As will be seen from the appended catalogue of species, the results have been a most gratifying enlargement of our local lists, and, in addition, we get a nearer approach to the truth as respects the local distribution of our plants. The untiring researches of Mr. R. Lloyd Praeger have been rewarded by most valuable discoveries. Mrs. Leebody, of Londonderry, has added considerably to our knowledge of the plant-life of her county—notably in the case of *Spiranthes Romanzoviana*, the finding of which in Derry followed so quickly on Mr. Praeger's record of its occurrence in Armagh.

The list which follows contains all the known additions to the north-eastern Flora (except Musci and Hepaticæ) since the publication of the work before-mentioned, and it also embodies additional localities for many of the rarer species, thus giving a truer idea of their distribution. A selection had to be made of the more important plants, but it is hoped that ere long a full and complete supplement to Stewart and Corry's Flora may appear. In anticipation of this, and in order to make it as complete as possible, local botanists should exert themselves to their utmost, and prove that in this delightful department of scientific work they will not be one whit behind the foremost districts in the empire.

¹ "A Flora of the North-east of Ireland, including the Phanerogamia, the Cryptogamia Vascularia, and the Muscineæ." By Samuel A. Stewart, F.B.S.E., and T. H. Corry, M.A., F.I.S., &c., 1888.

It will be observed that many of the records here collected have already appeared in various publications. The principal increase to the County Down flora is due to the exhaustive paper on the Mourne Mountain flora by Stewart and Praeger, in the Proceedings of the Royal Irish Academy¹. A number of notes from the Proceedings of the Belfast Naturalists' Field Club have been availed of; and the pages of the *Irish Naturalist* and of the *Journal of Botany* also contribute valuable information.

To the various naturalists whose names appear as contributors in the succeeding pages I am deeply indebted. It is due to their kind co-operation that this paper, condensed as it is, has assumed such goodly proportions.

The contractions used for authorities are—S. and P.—Stewart and Praeger, *op. cit.*; R. Ll. P.—R. Lloyd Praeger; S. A. S.—Samuel A. Stewart.

LIST OF RECORDS.

Ranunculus circinatus, Sibth.—In the Lagan Canal, Co. Down, close to its junction with Lough Neagh, R. Ll. P., 1892. Mr. Praeger reports it as abundant in the lough further to the west, at Derryadd Bay, Co. Armagh. This is a valuable and unexpected addition to the flora of the north-east. The plant does not seem to have been previously found north of the Liffey.

Papaver hybridum, Linn.—One plant on roadside near Killough, Co. Down, R. Ll. P., 1892.

Barbarea præcox, R. Brown—Fields at Struell Wells, near Downpatrick, R. Ll. P., 1891. This plant has been met with previously in the south of Ireland as an alien introduced. Not hitherto found in the north.

Cardamine amara, Linn.—Abundant on Co. Down side of the Lagan at Glenmore, near Lisburn, J. H. Davies.

Sinapis alba, Linn.—Abundant in many fields at Killowen, Co. Down, S. and P. Killough, Co. Down, R. Ll. P., 1892.

Draba incana, Linn.—Refound on Magilligan sandhills by Mrs. Leebody, in 1890, but small and scarce.

Lepidium campestre, Linn.—Sparingly in gravelly fields at Killowen, south of Rostrevor, S. and P. The only certainly ascertained locality for this plant in Co. Down.

Raphanus maritimus, Smith—Mr. J. H. Davies finds (1893) a second Co. Down station for this plant on the coast at Ballywalter. It is plentiful from Killough to St. John's Point, S. A. S., 1893.

Drosera intermedia, Hayne—Peaty marsh at Colligan Bridge on the Kilkeel River, also in another marsh to the southwest, and in boggy spots by the river near the base of Slieve Bingham, S. and P.

¹ "Report on the Botany of the Mourne Mountains, Co. Down"; *Proc. Roy. Irish Acad.*, 3rd Series, vol. ii., No. 2, 1892.

Elatine hydropiper, Linn.—In Loughbrickland, Co. Down, Rev. H. W. Lett, 1886, and subsequently. A new locality, and the only one in Ireland where this plant has been found recently. Mr. Praeger, when examining the duplicate specimens in the immense herbarium of Dr. J. Boswell Syme, now in the possession of Mr. F. J. Hanbury, F.L.S., London, found a number of sheets of Irish specimens of this plant. They are labelled, "Lagan Canal near high-tide water-mark, County Antrim, coll. August, 1847, and comm. by Dr. Mateer." This is, no doubt, the station "near Belfast, Dr. Mateer," published in *Flora of Ulster*, but which was discredited by the compilers of *Flora N. E. Ireland*, as vague and unreliable. Mr. Lett's new station, and Mr. Praeger's discovery are most welcome contributions to our knowledge of the local history of this very rare plant. There can be no doubt that it is now extinct in its Belfast station.

Sagina ciliata, Fries.—Very sparingly on sandhills at Newcastle, Co. Down, S. and P. An addition to the flora of the county.

Spergularia rubra (Linn.), Persoon—Abundant on the damp margin of Lough Islandreavy, Co. Down, S. and P., 1890. Very rare in district 12, and not known elsewhere in the county.

Lavatera arborea, Linn.—Summit of an isolated sea-stack on the shore of Rathlin Island, R. Ll. P., 1892. No doubt native here.

Hypericum quadrangulum, Linn. var. **maculatum** Bab.—Lane at Marino station, Holywood, R. Ll. P., 1892. New to the Co. Down flora.

Hypericum elodes, Huds.—Peaty marsh near Colligan Bridge, and several other places in Mourne Mountains, S. and P. Ballyarnott race-course, Co. Derry, Mrs. Leebody, 1891.

Geranium perenne, Huds.—Roadside near Whitewell quarries, W. D. Donnan, 1890. A new county record.

Erodium moschatum, L'Herit.—Annalong, Co. Down, H. C. Hart, *Proc. R.I.A.*, 1884, and subsequently, S. and P. Waste ground near Kil-lough, R. Hanna, 1893.

Rhamnus frangula, Linn.—Re-discovered (a good number of bushes) in Shane's Castle woods by Prof. R. O. Cunningham, 1890.

[*Ononis spinosa*, Linn., has not been re-found in Co. Down, and was, no doubt, a casual.]

Trifolium hybridum, Linn.—Frequent in sandy, cultivated fields, and waste ground, and though without claim as a native, is thoroughly established as a colonist.

Prunus cerasus, Linn.—Near Annalong, Crossgar, Downpatrick, and Crawfordsburn, Co. Down, also Cushendall and Ballycastle in Co. Antrim, and Draperstown in Derry, R. Ll. P., but not considered a native.

Poterium sanguisorba, Linn.—Plentiful in a meadow at Glenmore, near Lisburn, J. H. Davies, 1891. This is a limestone species, not known elsewhere in the north-east, and a doubt has been expressed as to whether the plant is a native here.

Sanguisorba officinalis, Linn.—Abundant and luxuriant on railway bank near Donaghadee, J. H. Davies, June, 1893. Interesting as confirming former records, and widening the Co. Down locality of this plant, so rare in Ireland.

Potentilla tormentilla var. **procumbens**, Sibth.—On the area in front of the Belfast Museum, S. A. S. Kilbroney and Newcastle, S. and P. Marino, Co. Down, R. Ll. P.

Agrimonla odorata, Mill.—Roadside at Steamboat-quay, Downpatrick, R. Ll. P. 1889.

Rubus ammobius, Focke.—In very small quantity by the lake-margin in Castletwellan demesne, Co. Down, S. and P., 1890. Not yet found elsewhere in Ireland. It is one of the rarest British brambles.

R. nitidus, W. and N. var. **hamulosus**.—Margin of Altnadua Lake, Co. Down, S. and P.

R. rhamnifolius, W. and N.—Magilligan, Co. Derry (J. Ball, F.R.S.) Focke, *Jour. Bot.*, June, 1891. New to Co. Derry.

R. umbrosus, Muell.—Whitewater and Donard Lodge, Co. Down, S. and P.

R. nemoralis, Muell. var. **pulcherrimus**, Neum.—Lisdalgan near Saintfield, Co. Down, Rev. C. H. Waddell, 1893.

R. pyramidalls, Kalt.—Tollymore Park, Donard Lodge, and plentiful in Moygannon Glen, S. and P.

R. macrophyllus, Weihe, var. **glabratus**, Bab.—Thickets by the Ghann River, Co. Down, S. and P.

R. Drejeri, G. Jensen.—Common about Saintfield, Co. Down, Rev. C. H. Waddell, 1893.

R. Koehleri, W. and N. var. **pallidus**, Bab.—Saintfield, Co. Down, Rev. C. H. Waddell.

R. chamæmorus, Linn.—After repeated unsuccessful searches by several botanists, this plant has been re-found in Ireland. Messrs. Hart and Barrington were so fortunate as to meet with it in 1892, on the Sperrin Mountains in Tyrone and Derry, thus verifying the old record of Admiral Jones. They report it as stunted in size, barren, and in very small quantity; *vide Jour. Bot.*, 1892, p. 279.

Rosa involuta, Smith.—This and its var. *Sabini*, Woods, occur by mountain roads near Hilltown, Co. Down; S. and P. Not known elsewhere in the county.

[*R. micrantha*, Smith, was recorded in "Flora N.E. Ireland" as occurring in Co. Antrim. This record was based on two imperfect specimens, considered by good authority as referable to that species. Last season, Rev. S. A. Brenan conducted Dr. Shoolbred to the original bush, and Dr. Shoolbred reports it to be *R. rubiginosa*. This reference has been confirmed by Rev. W. Moyle Rogers, and consequently *R. micrantha* must be deleted from our lists.]

Epilobium angustifolium, Linn.—Cliffs of Eagle Mountain, and south of Blue Lake, Mourne Mountains, S. and P. Not found as a native elsewhere in the County of Down.

Slum erectum, Huds.—Mr. Praeger finds this plant of frequent occurrence in the district around Downpatrick.

Ligusticum scoticum, Linn.—Rocky shore at Bushfoot, Co. Antrim, R. Ll. P., 1888.

Myriophyllum spicatum, Linn.—Western shores of Lough Beg, Co. Derry, R. Ll. P., 1893. An addition to the Derry lists.

Callummollugo, Linn.—Lawn at Rowallen, Saintfield, Co. Down, D. Redmond, 1893. Eglinton, Co. Derry, Mrs. Leebody, 1892. Not previously met with in Derry.

Valerianella dentata, Willd.—Cultivated fields about Killowen, Lisnacree, and Newcastle, S. and P. Killyleagh and Killinchy, Co. Down, R. Ll. P., 1890.

(TO BE CONTINUED.)

A NEW IRISH EARTHWORM.

BY REV. HILDERIC FRIEND, F.L.S.

I HAD almost come to the conclusion that the list of British terrestrial Annelids must be closed. For years past I have examined specimens by the thousand from every part of the country, and it is now many months since I have seen anything new. I had tried in vain to secure collections from the Highlands of Scotland and the western coast of Ireland, where new material was most likely to be found. At last, however, a well-tried collector and devoted naturalist, Dr. Trumbull, to whom we already owe one or two similar discoveries, has visited the west of Ireland and entered upon a successful campaign. His first consignment of specimens, which reached me about the middle of November, contained, in addition to eight representative species, one which is new to Britain, and has hitherto been recorded for only one other locality. Three years ago Prof. Michaelsen published in one of the Hamburg journals an account of a new species of earthworm found at Valencia in Spain. I believe it has not been heard of since, till unearthed at Clonmore, Co. Clare, Ireland. It seems desirable, therefore, that I should give a diagnosis of the worm, especially as I am able to enlarge, as well as endorse, the account already supplied.

Let us therefore take Prof. Michaelsen's account of the worm from Valencia (*Allolobophora Georgii*), and compare our Irish specimens therewith. I give a popular translation of the scientific diagnosis, that those who are not experts may be able to follow the account. My translation is based on the description of the species supplied by Dr. Rosa in his recent and invaluable revision of the Earthworms.¹ The original memoir of Michaelsen is not at present in my possession.

"The worm is 24 to 29 millimetres in length and $2\frac{1}{2}$ in diameter. It contains from 105 to 110 segments, and the form is somewhat trapezoid. The colour of the living animal has not been recorded, but the bristles are in pairs, of which the individuals are close together. The lip, which is small, has a large backward process or tenon, which cuts about a third of the first segment or peristomium. The girdle covers seven, sometimes eight, segments, extending from the 28th or 29th to the 35th. The tubercles on the girdle occupy segments 31 and 33, and are much enlarged transversely. The male aperture on the 15th segment is on a swelling, and the first dorsal pore is between segments four and five.

¹ "Revisione dei Lumbricidi," Torino, 1893.

Examined internally, the sperm-sacs in segments 10 and 11 open into the space between 9/10 and 10/11, in the direction of the fourth or dorsal setæ. In this respect it agrees with another species (*A. turgida*), with which also it corresponds in other respects."

I am bound to confess that many investigators would regard these two worms as simply varieties or sub-species, but this is no sufficient reason for ignoring their differences, even if they are slight; for, as Wallace has pointed out, it is by the study of minute variations such as these, which the older systematists disregarded, that we may hope to obtain light on the evolution of species. The specimens which I have received from Co. Clare correspond exactly with the description already given, but I am able to add a few details to the same, especially in regard to colour. I have examined a dozen living specimens, and may now submit the result.

Allolobophora Georgii, Mich.—Length from $1\frac{1}{2}$ to 2 inches, breadth one-eighth to one-sixth. There are upwards of 100 segments, twenty-eight of which usually precede the girdle, while seventy or more follow it. The girdle covers seven or eight segments, is closely fused on the back, but distinct on the under side, so that the rings can be easily counted. The tubercles on the girdle are in pairs, on segments 31 and 33. In colour the worm is darker than is usually the case with its nearest ally, *A. caliginosa* (*turgida*), and resembles some of the varieties of the Green Worm (*A. chlorotica*). Head ruddy brown, with a lighter patch where the sexual organs are situated, viz., between segments 9-12, and a dirty brown behind. The girdle is lighter than the rest of the body, and shews a tendency to a blue-grey. The colours are all indefinite, obscure, and difficult to define. It is evident that the worm would be specially adapted to poor soil. I have been able to detect the presence of those peculiar bodies known as spermatophores on more than one specimen, on segments 28-29 or 29-30. The similarity between this worm and its two nearest allies will be seen if the numerical formula representing the girdle and tubercle-segments of each are set forth. The numerator represents the segments occupied by the tubercles or papillæ (*tubercula pubertatis*), and the denominator the girdle-segments. The numbers in brackets shew the overlapping of the girdle where it is not constant.

<i>A. turgida.</i>	<i>A. Georgii.</i>	<i>A. chlorotica.</i>
31 : 33	31 : 33	31 : 33 : 35
(27) 28 — 34 (35)	(28) 29 — 35	(28) 29 — 37

There are now four earthworms known to occur in Ireland, which have not been found anywhere in Great Britain. Two of these (*Lumbricus papillosus*, Friend, and *Allurus macrurus*, Friend) are unknown at present outside the Emerald Isle. The other two (*Allolobophora hibernica*, Friend, and *A. Georgii*, Mich.) occur in Italy or Spain, though the intermediate countries, England and France, know them not. It is too early yet, however, to speculate on the bearing of this fact upon the

interesting subject of island faunas and floras. I trust that the discovery of Dr. Trumbull will result in other collectors from the west and south consigning to me series for examination.¹

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

The Gardens have recently acquired a Jaguar, a Hairy Tapir, a Golden Agouti, three Tree Ducks, two Curassows, four Crested Quail, and two Black Parrots, by purchase.

2,583 persons visited the Gardens in December.

DUBLIN MICROSCOPICAL CLUB.

NOVEMBER 16th.—The Club met at Mr. G. H. CARPENTER'S, who showed the stridulating organ of a red ant (*Myrmica ruginodis*). This organ, which has been recently described by Dr. D. Sharp (*Trans. Ent. Soc.*, 1893) consists of a number of very minute transverse striations upon the constricted collar of the third abdominal segment. The hinder edge of the second segment is produced downwards into a sharp ridge which, by scraping across the striations, produces a note of very high pitch.

Dr. R. F. SCHARFF showed a woodlouse, *Trichoniscus roseus*, new to the Irish Fauna. This woodlouse is distinguished from other members of the genus principally by its brilliant colour, which is of a light vermillion with a yellow stripe down the back. A more detailed description of this species and its affinities is published in this number of the *Irish Naturalist*. It had previously been known only from Plymouth, where it was found in Prof. Spence Bate's cellar; the present record is therefore not only the first for Ireland, but also the second for the British Isles. It was discovered among damp cinders in a garden in Leeson Park, Dublin, and the identification has been confirmed by Prof. Budde-Lund of Copenhagen.

MR. GREENWOOD PIM exhibited specimens of *Puccinia coronata*, Corda, sent him by Prof. Johnson from several localities in Dublin and Meath, where this season it seems to have been a great nuisance. It is peculiar in having short blunt appendages on the top of the spore, which are found in no other British *Puccinia*. It is the first record in this Dublin district, but Mr. Lett finds it in the North.

MR. F. W. MOORE showed the conidial stage of *Xylaria rhopaloides*, sections of which had been exhibited at a previous meeting, the reproductive stage not being then available.

PROF. T. JOHNSON exhibited a preparation of *Bonnemaïsonia asparagoides* C. Ag., showing carpospores germinating *in situ*. The specimen was found drifted on the shore at Sutton on the north side of Dublin Bay and was of interest because the appearance of the carpospores in some of the cystocarps suggested zonate tetrasporangia; *B. asparagoides*, though growing round the whole British coast, being one of the few Florideæ in which tetraspores are not known.

¹ Such packages, preferably tin boxes lightly packed with soft clean moss to keep the worms healthy and fresh, should be sent to 7, Fern Bank, Cockermouth, Cumberland, labelled NATURAL HISTORY SPECIMENS ONLY.

MR. M'ARDLE exhibited specimens of a liverwort, *Frullania germana*, Tayl. which is often passed over for the commoner *F. tamarisci*, Mich., leaves of which he also exhibited to show the characteristic line of cells, the contents of which are peculiar; this peculiarity does not occur in the leaves of *F. germana*, and forms one of the marks of distinction between the two plants. It is also a more beautiful object than *F. tamarisci*, larger and with greater lustre, and the bracts of the perianth are entire. The auricles are larger and more highly coloured, oblong ovate in shape, ventricose. Mr. M'Ardle also exhibited dried specimens of both plants mounted on card-board, which he collected last October on Slieve Glah, Co. Cavan, which is a new locality for the plant.

PROF. A. C. HADDON showed the two kinds of budding in the polyzoon *Flustra*; the one by means of which the colony is maintained, the other peripheral, causing the growth of the colony. In the former the parent organism decays and forms a "brown body" which is digested by the daughter bud.

DR. R. H. CREIGHTON of Ballyshannon sent for exhibition microphotographs of Phyllopod crustaceans obtained in the north-west of Ireland.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

JANUARY 2ND.—The President (PROF. FITZGERALD, M.I.C.E.) in the chair. MR. CONWAY SCOTT, C.E., delivered a lecture on National Health. An animated discussion ensued, in which the following took part:—Dr. Whitaker, Prof. Redfern, Dr. MacCormac, Messrs. Cowan, C.E., Robert Gray, Seaton F. Milligan, M.R.I.A., J. H. Greenhill, John Horner, J.P., William Armstrong, and Henry M'Loughlin.

BELFAST NATURALISTS' FIELD CLUB.

DECEMBER 20TH.—The President (MR. WM. SWANSTON, F.G.S.), gave a short opening address, his subject being "The Study of Geology, and the advantages to be derived therefrom." MR. WM. GRAY, M.R.I.A., gave a lecture entitled "What is a Stone? Being a Demonstration of North of Ireland Rocks."

DUBLIN NATURALISTS' FIELD CLUB.

JANUARY 9TH.—Annual Meeting. The President (DR. M'WEENEY) in the chair. The Secretary (MR. J. M. BROWNE, B.A.), read the annual report, which was passed, as was also the statement of accounts, which was submitted by the Treasurer (PROF. JOHNSON, D.Sc.). Both showed the Club to be in a flourishing and sound condition. The election of office-bearers was then taken up. MR. G. H. CARPENTER, B.Sc., was elected President, *vice* Dr. M'Weeney, retired. Prof. G. A. J. COLE was elected Vice-President, *vice* Dr. Scharff, and Mr. R. LLOYD PRAEGER Hon. Sec., *vice* Mr. J. M. Browne. MRS. J. T. TATLOW, and MR. N. COLGAN were elected to fill vacancies on the Committee. The new Vice-President, Prof. COLE, having taken the chair amid applause, a hearty vote of thanks was passed to the outgoing officers for their constant devotion to the Club during their term of office. On the motion of DR. M'WEENEY, a sum of £5 was voted to the editors of the *Irish Naturalist*, to help towards defraying the expenses of the Journal during the present year. PROF. JOHNSON, D.Sc., announced his willingness to give a course of lectures and demonstrations on botany for the benefit of the members of the Club. Several members spoke in grateful terms of the generosity of Prof. Johnson's proposal, and the Secretary was instructed to issue a circular, in conjunction with Prof. Johnson, acquainting members with the proposal.

NOTES.

BOTANY.

PHANEROGAMS.

Artemisia Stelleriana in Co. Dublin.—In the *Journal of Botany* for January, Mr. N. Colgan records the finding of this handsome plant on the North Bull by Mr. C. B. Moffat. The plant grows in scattered patches among the sandhills, and appears quite naturalized. It is a native of Kamtschatka.

Fall of Leaf of the Holly.—It is worth noting as an effect of last year's unusually long summer, that all the Hollies that I have observed or heard of in this part of Co. Down and the adjoining districts of Co. Armagh, let fall their old leaves of 1892 growth at the end of November and beginning of December, 1893. April is the month when this evergreen in ordinary seasons performs this change of leaf, so that what I have just noticed has taken place nearly five months before the regular time of the fall of the leaf of this shrub.—H. W. LERT, Loughbrickland.

County Dublin Flora.—On looking over the "Notes on the Dublin Flora" which appeared in last month's issue of this Journal, it occurred to me that some readers might be in danger of so misconstruing certain passages in the paper as to carry away an impression that I was averse to receiving aid from other botanists in the work of preparing a county Flora. To prevent any such misrepresentation, which, I am sure, my friend, the writer of the recent notes, is quite as anxious to guard against as I am myself, I take this opportunity of once more expressing my desire to receive any information likely to throw light either on the history or on the actual state of the Co. Dublin flora. Before the close of last year I had received assurances of aid from almost every botanist who has paid special attention to the Co. Dublin. These willing helpers are, I know, content to await full acknowledgement, at the proper time and in the proper place, for the assistance they have already given me, and will, I am confident, continue to give me. For them, such a notice as this is superfluous. There are others, however, and perhaps, not a few, who while they have made no special study of the Dublin flora, may, nevertheless, have made some casual observations of interest; and it is to ensure the collection of such occasional memoranda that I have requested the editors to grant me space for these few words.—NATHANIEL COLGAN, Dublin.

ZOOLOGY.

ROTIFERS.

Mellicerta ringens.—In one of my aquariums I have at present an immense generation of *Mellicerta ringens* of all stages of growth, from the young ones busy laying the foundation-stones of their tubes, to very full-grown tubes of unusual length. The thing, however, which I wish to note is that sometimes one tube is seated upon another in almost every variety of order from clusters of two up to clusters of seven. I have never seen anything like this before in the case of *Mellicerta ringens*. They seem to be breeding very rapidly, for on a plant of *Ranunculus aquatilis*, which in a beautiful arborescent growth fills the aquarium, they are abundant. I think this clustered condition of the tubes arises from the fact that there are no quick-moving creatures in the aquarium, such as water-boatmen or water-beetles, to make a stir in the water, and the eggs being extended in this motionless pool are not floated away to a new site, but get attached to the side of the parent tube and proceed to build there; and so we find them as I have described. To see *Mellicerta ringens* at work, building and dining at the same time, is always an interesting sight; but

to see a cluster of them so engaged is a spectacle of beauty indeed. I observe that this beautiful rotifer much prefers building on such narrow leaves as the under-water foliage of *Ranunculus aquatilis* to building on broader ones, such as the *Potamogetons* or even the *Anacharis*. I shall be very pleased if any brother naturalist desires to see this case that he should call at 25, Rugby-road, Belfast. I think it probable that any one might have this rotifer in this condition by having a good seed of them in a quiet aquarium where only the *Planorbis* and *Limnæa* or such slow-moving creatures are kept, and the water allowed to be very motionless.

JOHN ANDREW, Belfast.

INSECTS:

Lepidoptera in the Belfast District in 1893.—The season of 1893 in this district, as in most others, has been fairly productive in lepidoptera, although, in consequence of the abnormal heat, many species emerged much before their usual time, and had disappeared completely when they were looked for in their usual localities. Of the butterflies, *Vanessa atalanta* and *V. urticae* have been unusually abundant, and second broods of both species were seen; of *Argynnis paphia*, a few specimens were seen in Donard demesne near Newcastle, Co. Down, on June 18th, a very early date for the species; *Lycena minima* was out already on May 30th on the cliffs of Island Magee, and a few were seen on Knockagh, near Carrickfergus; one specimen of a second brood of *Ctenonympha pamphilus* was taken on the Belfast Hills on September 3rd; the species is regularly double-brooded in England, but usually single-brooded in Ireland. Among Sphinges, *Macroglossa stellatarum* was hovering about a white-washed wall on the shore at Newcastle on July 16th, and *M. bombyliiformis* was abundant at flowers of *Pedicularis* on the Belfast Hills as early as May 7th. Of the Bombyces, *Nemeophila plantaginis* was abundant on the slopes of Island Magee, June 4th; *Hepialus velleda* was very common everywhere this year, flying in crowds over Bracken on the hills and over beds of Nettles on the lowlands; larvæ of *Bombyx quercus* v. *callunæ* were found full-fed at Black Head, June 23rd, and larvæ of *Dicranura vinula*, *Saturnia pavonia*, and *Pygmaea pigra* (or *curtula*) on dwarf willow bushes in the valley above Bloody Bridge, Mourne Mountains. Of Noctuæ, *Bryophila perla* occurred on walls at Newcastle, all the specimens being typical; pale form of *Acronycta rumicis* comes commonly to sugar in the woods at Newcastle; of *Hydracia nictitans*, the specimens occurring in this district, both in the marshes about Belfast and on the sand-hills at Newcastle, belong to the form which has been distinguished as a probably distinct species (*H. lucens*). I have not taken typical *nictitans* in this district, but have a specimen from Wicklow; *Apamea ophiogramma*, one specimen in Belfast marshes; *A. leucostigma* is common in the same locality, the type and var. *fibrosa* being equally common. *Miana literosa*, a few in the same places as the last species; it was very abundant at Howth in July; *Celana Haworthii* was common on the hills at the end of August; *Stilbia anomalæ*, one specimen in the Mournes; *Agrotis vestigialis* was abundant on the sand-hills near Dundrum, Co. Down, nearly all being of the pale typical form, but a few grey suffused specimens occurred; *A. cursoria* was scarce in the same place; *A. tritici* very abundant, mostly of the reddish-brown form common on the Irish coast sand-hills, but a few grey and pale red specimens were picked out of the hundreds that covered the flower heads of *Senecio jacobææ* on the sand-hills; *A. præcox* was common in the same place, and a few *A. lucerneæ* also occurred; *Teniacampa opima* was taken at willow bloom in April, together with commoner species of the genus; *Xanthia fulvago*, at Belfast in August; *Cirrhædia xerampelina*, two specimens on the trunk of an Ash in Castlewellsan Park, August 14th; *Dianthæcia nana*, commonly at flowers of *Lychnis flos-cuculi* in Colin Glen; *Hadena adusta* at rest on heather on the Belfast hills in May; *H. contigua*: a re-

markable specimen was taken in the Mourne Mountains in July; it was just out of the pupa, and all the dark parts of the fore-wings were suffused with deep rose-pink, while the pale portions were a semi-metallic green; these colours faded gradually, and disappeared completely in about two months. Of *Geometrae*, *Ellopiä prosapiaria* was common in Donard demesne in June; *Nyssia zonaria*, very abundant on April 3rd at Ballycastle; one female was seen on the 1st; I failed to find the species either at Whitepark Bay or at Portrush. *Boarmia repandata* v. *conversaria*, a specimen of this fine banded variety was seen, and missed, in Donard demesne on June 18th; *Gnophos obscurata*, the specimens from Newcastle are very dark; it occurs both on the sandhills and on the hill-sides; *Eupithecia indigata* occurred at Belfast and *E. constrictata* at Island Magee; *Melanippe tristata* was swarming about *Galium* on Knockagh on June 7th; *Phibalapteryx lapidata*—of this scarce species I took five specimens on the side of Divis Mountain on September 3rd; the males were much worn, but the females nearly fresh from the pupa; *P. vittata* was as common as usual in the marshes near Belfast, where its food-plant, *Galium palustre*, is abundant.—CHARLES W. WATTS, Belfast.

Lepidoptera at Strabane.—The Scarlet Admiral (*Vanessa atalanta*) was this season in great numbers all over the north-west of Ireland, a district where in most years it is unknown. The Painted Lady (*V. cardui*), which is generally to be found in the same seasons as *V. atalanta*, has been, as far as I know, absent. I observed a Humming-bird Hawk-Moth (*Macroglossa stellatarum*) hovering over a scarlet Geranium in the garden here.—W. SINCLAIR, Strabane.

Lepidoptera at Enniskillen.—Lieut.-Col. Partridge gives (*Ent. Mo. Mag.* Dec. 1893) an interesting list of 283 species of lepidoptera from this district.

Irish Coleoptera—Remarks.—Mr. Tomlin's experience last summer at Port Ballintrae is quite parallel with mine at Courtown:—great abundance of specimens in certain cases, but great paucity of species. About 1,200 species of beetles have now been put on the Irish list, and new records are being made every year, owing to the recent increase of interest in local entomology. Beetles, however, are distributed with considerable irregularity, and it is not easy in the space of a summer holiday to compile a large list for a particular district. For instance, *Helops pallidus* occurs at roots of bent on the sandhills at Courtown, but I failed to find it after much searching on the sandhills of south Louth; *Chrysomela hyperici* is absent from the St. John's-worts of south Louth, but abounds at Courtown on *Hypericum dubium* and *H. perforatum*; *Nebria complanata* is abundant at Courtown, but absent in Louth; on the other hand *Dichiroichus pubescens* and *Phaleria cadaverina* are abundant in Louth, but I could not find them at Courtown;—yet the general features of both localities are almost identical. Mr. Tomlin's list contains some interesting species, one or two of which, e.g. *Bradycellus harpalinus* and *Holophorus rugosus* are quite familiar to me, but he is hardly safe in taking Canon Fowler's work as a guide to Irish records. It is not quite up to date. Thus within the last four years I have taken various species, such as *Pogonius littoralis* and *Pocadius ferrugineus*, not credited to Irish localities by Fowler, Rev. W. F. Johnson, F.E.S., and others, notably Mr. J. N. Halbert, have added, and are constantly adding, new and valuable records to our Irish list.—H. G. CUTHBERT, Blackrock, Dublin.

MOLLUSCS.

***Hyalinia helvetica*, Blum.; An addition to the Irish Fauna.**—In November, 1892, I collected, at Whitegate, Co. Cork, a series of shells belonging to a form of *Hyalinia* which did not agree with any British species of which I had seen descriptions. In June, 1893, I sent specimens to Dr. Scharff, who informed me that he had found at

Bantry a few days previously a *Hyalinia* of the same form. Specimens were then submitted to Prof. Boettger of Frankfort and Dr. Westerlund of Ronneley, Sweden, both of whom agree, as also does the original describer, in pronouncing it to be *Hyalinia helvetica*, Blum. This species is new to the Irish Fauna, but it has been found in Switzerland, and according to Mr. Westerlund also in Brittany. As both he and Prof. Boettger assert that they possess English specimens of this species, it may be the *Hyalinia glabra* of English authors (distinct from *H. glabra*, Stud.) At Whitegate it appears to be very scarce, but Dr. Scharff says that at Bantry it is common. The shell is about the size of *H. cellaria*, but the umbilicus is much narrower (for description see *Nachrichts bl. Malak. Ges.*)—R. A. PHILLIPS, Cork.

BIRDS

Feather Ornaments.—"A Lover of Nature" writes as follows to the *Irish Times*, and his remarks are well worthy of the serious attention of our readers:—"Will you allow me to call the attention of your readers to a letter by the clever author of "The Naturalist in La Plata," Mr. W. H. Hudson, in the *Times* of October 17th, and now reprinted by the Selborne Society, urgently expressive of the thoughtless cruelty of those who wear, or encourage the use of, stuffed birds, wings, and "ospreys" in millinery, and other decoration. Not only is it a useless waste of life, but if this fashion continues much longer the next generation may bitterly tax us with the destruction of the whole race of these beautiful gifts of nature. Already the white herons which supply the "osprey" feathers are entirely exterminated in Florida, where a few years ago they congregated in flocks for the breeding season (in 1887 I saw them there myself), and the lovely, crimson-throated humming birds are practically extinct throughout North America. And is this any marvel when we consider that for 25 years the custom of wearing birds has existed, and "nine years ago it was estimated that 20 to 30 millions of birds were annually imported to this country to supply the demand." Will not the ladies who are thus ruthlessly despoiling nature of its gems and thoughtlessly flaunting cruelty, stop ere it is too late, and show that they love beauty for its own sake and not merely as the conventionalities of fashion dictate, and so refuse to buy hats and bonnets decorated with birds and "ospreys"? Surely it is want of thought not want of heart that keeps up this cruel fashion.

The Garden Warbler in Ireland.—It will interest many of your readers to hear of the Garden Warbler (*Silvia hortensis*, Bechst.), being found in the Co. Cork. As far as I have been able to gather, it has not been observed in the county since 1852, when Mr. R. Parker, Sunday's Well, Cork, saw it on several occasions. I had been taking notes for years on birds, but accidentally burned them, so cannot say year for certain, but think it was in 1876 that I saw a cock Garden Warbler at Cuskinny, near Queenstown. I saw no hen about, but it might have been hatching at the time, though I saw no young ones later on. In 1888 I also saw a cock bird at Rockenham, Passage West, and the same remarks apply to it as the above. This year (1893) I had a good opportunity of observing the Garden Warbler at Monkstown, Co. Cork. I cannot be mistaken in the identity of this bird on these occasions, as I both saw it and heard it in Cheshire in 1880 and 1888 on numerous occasions, and also several times with an experienced ornithologist who was quite familiar with the species. This year, by standing concealed for a considerable length of time on several occasions in one position with an opera glass, I had a good view of the pair. On one occasion the pair flew almost into my face when the cock was chasing the hen rather ardently from some brambles—they had to turn aside to avoid flying against me, so I had a good view of them. The colours are more decided and in greater contrast than in the other warblers, being olive-brown above and white underneath,

They were often in the branches of deciduous trees with an undergrowth of shrubs, brambles, &c., amongst which they worked in and out and dropped out of sight the moment observed. They do not remain in the same spot long, and the only way to see them is to stay concealed *till they come to you* (this applies to many other birds), as otherwise they never give you a chance. Where this pair was there is a good deal of shrubs and undergrowth of brambles, &c., below the trees. The cock has rather an intense way of singing, and it comes in a volley, and is very loud for so small a bird, and has a resemblance to the song of the thrush and blackbird, but more spasmodic and snatchy; and the notes seem to burst out of him, and when he gives a short song he generally flies off to another part of the tree, or to another tree or shrub. The song ceased about 24th June. I tried to find nest, but did not succeed; I believe it was in a place I had not access to.—J. CROSBIE SMITH, Monkstown, Co. Cork.

White variety of the Sparrow (*Passer domesticus*) in Co. Galway.—On the 11th November, Mr. P. Collis Johnston, of Fohena, Co. Galway, secured a very fine specimen of a white Sparrow, which can be seen at the establishment of Messrs. Williams and Son, Dame-street, Dublin.—J. H. JOHNSTON, Armagh.

Crossbills (*Loxia curvirostra*) in Co. Cork.—In November, 1887, I heard the unusual sound at this season of the crackling of the fir cones (in the heat of the summer the cones burst open with a crackling sound and the seeds fly out). Though I had never seen a Crossbill before, I said to myself "Crossbills," and sure enough when I looked up at the fir-trees, I saw a lot of Crossbills at work on the cones. There must have been hundreds, and they continued, on and off, about the district till the spring, and remained, as far as I knew, till end of June, when I went away and did not return till October, when they had all disappeared, and I never observed any since. I knew of thirteen nests about the Monkstown (Co. Cork) district, and I feel sure there were many others, as I saw more birds than nests, and I also saw Crossbills at Ballybricken, Coolmore, Currabinny, Carrigaline, &c. The nests were in the upper branches of pines and firs, and were mostly on the outer end of the branch, and were all inaccessible except to a very good climber, but I saw the parent birds frequently about the trees and nests, and that satisfied me as to the fact of their nesting. My own belief is that many birds are not so rare as supposed, simply because we do not happen to see them, and as there are so few observant ornithologists, many rare birds must pass unnoticed. Some of the rarest birds that have visited our island were secured by the merest accident, as one may see by the various accounts written on the subject, and by what many know by their own experience. These Crossbills were noticed by several other people.—J. CROSBIE SMITH, Monkstown, Co. Cork.

Supposed Woodpecker in Co. Dublin.—One day about the middle of November, while driving between Lucan and Knockmaroon, Co. Dublin, I saw a black and white bird that was new to me. It flew across the river Liffey and alighted on a tree in Woodlands demesne. On describing it afterwards my husband said it was probably a woodpecker, and after looking at the woodpeckers in the Science and Art Museum I think there is no doubt that the bird was a woodpecker, but of which species I am unable to say.—JANE W. SHACKLETON, Lucan.

Bittern (*Botaurus stellaris*, L.) in Co. Wexford.—A Bittern was shot, last March, near Drinagh, close to Wexford, by Mr. Wheelock of that town for preservation. I have been unable to see it, but it was seen by Mr. J. H. Gurney of Keswick Hall, Norwich.—G. E. H. BARRETT-HAMILTON, Kilmanock, New Ross.

Little Auk in Co. Sligo.—When walking on the Enniscrone sands, on November 19th, I picked up the remains of a Little Auk, *Mergulus alle*, destroyed by the gulls. It was in a perfectly fresh state, however, and had evidently come ashore but a few hours previously. Along the same

sands I also found several Puffins, Razorbills, and Guillemots, all driven ashore by the N.W. gale of the two previous days.—ROBERT WARREN, Ballina (in *Zoologist* for January).

Great Shearwater in Killala Bay, Co. Mayo.—In the *Zoologist* for January, Mr. R. Warren writes, that on 23rd April last, he watched a flock of eleven Great Shearwaters (*Puffinus major*) fishing near the pier-head of Enniscrone. He remarks that he never previously saw them on the Irish coast in April, and suggests that they may possibly breed on some part of the sea-board.

OBITUARY.

JOHN TYNDALL.

THE death of Tyndall on December 4th, at his house, at Hindhead, Surrey, removes from the world of science one of the most famous Irishmen of the century. He was born at Leighlin Bridge, Co. Carlow, in 1820. After serving on the staff of the Ordnance Survey, and practising as an engineer at Manchester, he began his purely scientific work in 1847, as teacher of physics in a Hampshire school. Thence he proceeded to Germany, where he studied at Marburg under the celebrated Bunsen, and afterwards at Berlin. Physical investigations of great value then made him famous, and on his return to England in 1853 he was appointed professor at the Royal Institution, where he worked in company with Faraday. He resigned his appointment in 1883, since which time he has lived either in Switzerland or in Surrey.

It would be inappropriate, in this Magazine, to dwell upon the purely physical researches which formed the greater part of Tyndall's scientific work. At several points, however, his work touched the domains of natural science. He was one of the most daring of Alpine climbers, and during his holidays in Switzerland, he made the classical researches upon the motion of glaciers, which must always guide our speculations as to the action of ice in past ages of the earth's history. He was also a pioneer in the study of the minute organisms which we know generally as bacteria; his researches, carried on in the pure air of his Alpine retreat, proved that these humble forms of life are developed from living germs, and that their origin from dead matter must remain a matter for speculation. But Tyndall's best-known service to biology was his popular advocacy of the evolution theory. His power of clear exposition, and his Celtic imagination and eloquence, which made his physical lectures and books so popular, came to the aid of the evolutionists in the great conflict which followed the publication of the "Origin of Species" in 1859. One of Tyndall's most powerful strokes in this conflict was made on Irish soil, when, in 1874, he presided over the British Association at Belfast, and delivered the address which roused such a storm of opposition in some quarters. Tyndall's metaphysical and anti-theological speculations which largely caused this opposition need not be discussed here. It is recognised, by this time, that the student of nature may accept the physical and biological positions of the dead master without committing himself to those,

G.H.C.

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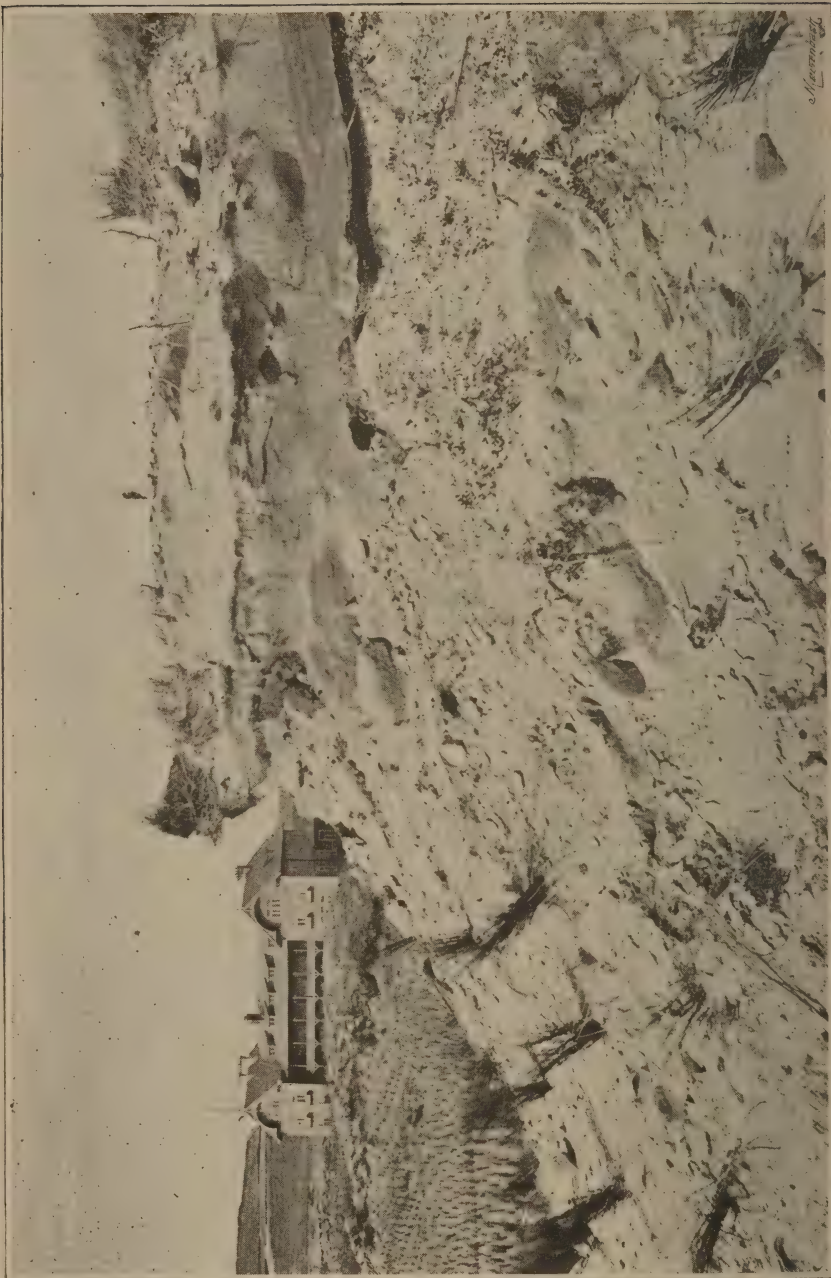
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SHELL-MOUND AT ROSAPENNA HOTEL, CO. DONEGAL.

From a Photograph by Mr. R. Welch.]

The Irish Naturalist.

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MARCH, 1894.

No. 3.

SHELL-MOUNDS AT ROSAPENNA, NORTH DONEGAL.

BY W. H. PATTERSON, M.R.I.A.

I VISITED Rosapenna in July, 1893, and had an opportunity of spending a little time among the sand-dunes there. The great strand, Tra-More, at the head of Sheep-haven, is the western boundary of the dunes, which are here about two miles in length, while they extend backwards from the sea, till a part of them touches the waters of Mulroy Bay; in fact, but for these sand-hills, it seems that the waters of the two bays would meet, and that Rosapenna and Rosguill, which now form a peninsula, would be an island.

These sand-dunes at Rosapenna must have been a favourable dwelling-place, or at any rate a favourite camping-ground with an early race of people. In many places among the dunes the shell-mounds, or kitchen-middens, of the old people are found, in most places broken down by the winds, and their contents scattered, and bleaching on the sand. Some portions of shell-mounds may still be seen undisturbed, and their contents, thrown together by the old people, can still be handled. Sand and wood-ashes, mixed with shells of edible species of mollusca, and bones of all sizes, including numerous large teeth, make up the bulk of these mounds. The bones in the mounds are brown and damp, while those that lie on the surface are dry and white, owing to the action of the sun and weather. The shells also have darker and fresher colours than those which have long since been scattered about.

Mr. S. A. Stewart has been good enough to name the shells which I put before him ; these were collected hurriedly, and I feel sure do not represent all the species common in the mounds ; most, if not all, of these were present in great numbers :—*Patella vulgata*, *Cardium edule*, *Littorina litoria*, *Mytilus edulis*, *Ostrea edulis*, *Pecten opercularis*, *Pecten maximus*, *Buccinum undatum*, *Solen siliqua*, *Cyprina islandica*, *Lutraria elliptica*, *Purpura lapillus*, *Venus verrucosa*. Mr. Stewart adds : —“*Venus verrucosa* is a southern species, and has not, I believe, been found as a recent shell in the North of Ireland. It is not uncommon on the southern and western coasts of England and in the Channel Islands, and also in the south-west of Ireland. It lives at five to ten fathoms on a sandy bottom. It is plentiful in Clare, and is said to be used there as food.”

In the shell-mounds, the Limpet and Periwinkle (locally called Wilk) were by far the most numerous, outnumbering all the other species together. Many of the shells were of exceptionally large size, while all were mature specimens. In one hollow place there was an extraordinary accumulation of the shells of *Lutraria*, but all broken into small pieces, and three or four large stones, which probably served as the blocks upon which they were broken, were in and near the heap.

The Mussel-shells, which were numerous, were much decayed ; this shell seems to be more perishable and to break up more easily than any of the others named. The claws of a large crab (*Cancer pagurus*) were among the specimens submitted to Mr. Stewart. I saw many other fragments of the shells of crabs, but they were all in a crumbling state.

The bones of large and small animals were literally in thousands ; the box of those which I brought to Belfast has not yet been carefully examined, but the more apparent bones are those of the Ox, Horse, Sheep, Pig, Dog, and Red Deer ; many jaw-bones were quite perfect, while great numbers of large teeth were scattered everywhere ; the long bones were generally split lengthwise for extraction of the marrow. One blade-bone had been deeply cut with some sharp tool. Birds' bones were common, and an awl or spear-head made from the leg-bone of a large bird, and ground to a sharp point, was found. A few fish-bones were mixed with the shells, &c., showing that the people had the art of fishing.

Works of art among the shell-mounds were exceedingly few : there was a total absence of pottery, also of flint ; not even chippings were found, nor any of the axes so common in the Danish shell-mounds. I was shown an ancient glass bead, and several quern-stones or hand-mills, found in the sand-hills ; also two beautiful bronze pins or brooches, one of which was found by the manager of the Rosapenna Hotel, the other by Mr. Robert Bland : these may have been 10th century. A small portion of a bone comb was given to me : it is similar to combs found in Irish crannogs, and may not be older than 1600-1700, A.D.

I observed a large quantity of pieces of furnace slag, showing that at some period the smelting of iron-ore was carried on here. I found some portions of a human skeleton, including parts of the skull, and a good number of the teeth, some loose, and some still in their sockets ; the teeth were perfectly sound, but were worn down quite flat, evidence that much gritty matter, either sea-sand or grit from the quern-stones, had been mixed with the food used.

From the number of bones of animals which must have been domesticated, it would seem that these people were not of a very primitive race ; on the other hand, the absence of pottery would point to a very early period. Probably further investigations may lead to discoveries which will settle whether the people who formed the shell-mounds, belonged to the earlier or later stone age, or perhaps to some other defined period.

The illustration (Plate 3) which accompanies this paper shows a portion of the Rosapenna sand-dunes near the new hotel, where the wind is cutting into the ancient mound and laying bare its contents ; it is from a photograph by Mr. R. Welch, Belfast.

NOTES ON THE FLORA OF THE NORTH-EAST OF IRELAND.

BY SAMUEL A. STEWART, F.B.S. EDIN.

(Concluded from page 38.)

Solidago virgaurea, Linn., var. ***angustifolia*** Gaud.—Plentiful and characteristic on rocky banks of Shimna River in Tollymore Park, and by the Bann above Hilltown, S. & P.

Bidens cernua, Linn., forma ***radlata*** is plentiful at Carrickmannan Lake, near Saintfield, S.A.S., 1893. Quoile marshes, Downpatrick, R. L.P., 1892.

Saussurea alpina, DC.—One spot only, on Slievemuck, Mourne Mountains, at 2,000 feet, S. & P. A few plants growing on dripping rocks, but they seem to produce neither flowers nor seed. Not known elsewhere in district 12.

Arctium minus, Schkur., var. ***majuscula*** Hartm.—Base of cliff at Bankheads, near Larne, S. A. S., 1873, and waste ground at Larne, S.A.S., 1876. The specimens referred to above were submitted to Herr Murbeck, the able Scandinavian botanist, who has specially studied the genus *Arctium* or *Lappa*, and are the first certainly ascertained plants from this district referable to this species. The authors of "Flora N. E. Ireland" did not include *A. minus* in their lists, as at that time no North of Ireland specimens had been determined on sufficient authority. Herr Murbeck considers that *A. nemorosum*, Lej., and *A. intermedium*, Lange, are synonymous, and if so one of those names must be deleted from our local flora.

Carduus crispus, Linn., var. ***acanthoides***,—Killowen, Co. Down, S. and P. Mr. Praeger has refound this plant at Larne.

Carduus pratensis, Huds.—Several stations in the Mourne Mountains, S. and P. The only other record for Co. Down was considered doubtful.

Leontodon hirtus, Linn.—Dalchoolin near Craigavad, 1892, and Narrow-water, 1893, R. L.P.

Hieracium euprepes, Hanb.—I met with this plant on the Cave Hill, near Belfast, in 1877, and specimens collected then, and subsequently, were sent to Mr. Backhouse, of York, for identification. After a correspondence, which lasted for some years, he finally advised that my plant should be put as a form of *H. pallidum*, and when preparing the "Flora N. E. Ireland" this course was adopted. Mr. Hanbury of London, our present authority on British *Hieracia* has, however, met with and studied the same plant in Great Britain, and has raised it to the rank of a species under the above name. Mr. Praeger informs me that Mr. Hanbury has specimens of this hawkweed collected by the late Dr. Mateer, of Belfast, on the Cave Hill in 1845. They are in the herbarium formed by the late Dr. Boswell, now included in the Hanbury herbarium. The distribution in Ireland, as at present known, is on limestone or basaltic rocks almost entirely. Cave Hill and Sallagh Braes, Co. Antrim, S.A.S. Boulder clay bank, Milltown, Co. Antrim, Dr. W. A. Shoolbred, 1893. Basaltic cliffs of Benevenagh, Co. Derry, S.A.S.

Hieracium anglicum, Fries.—Frequent in Mourne Mountains, S. and P.

Var. **acutifolium**, Back.—By the Shimna above Tollymore Park, and by a stream on Luke's Mountain near same locality, S. and P.

Var. **longibracteatum**, Hanb.—Garron Point, and Glenariffe, Co. Antrim, Dr. Shoolbred, 1893.

[*H. pallidum*, Fries. The Antrim and Derry localities for this species have mostly been transferred to *H. euprepes*; the remainder are doubtful.]

H. argenteum, Fries.—Cliffs of Eagle Rock (Slieve Donard), Bencrom, and Cove Mountain, in Mourne range, plentiful, and sparingly by the Shimna River in Tollymore Park, S. and P. The *H. argenteum* of Broughnamaddy has been described by Mr. Hanbury as a new species under the name of *H. hibernicum*.

H. rubicundum, Hanb.—Sallagh Braes, Co. Antrim, S.A.S. The only other Irish station yet known is in Co. Donegal (Hart).

H. farrense, Hanb.—Sallagh Braes, S.A.S. Not found elsewhere in Ireland.

H. stenolepis, Lindeb.—Plentiful on Cave Hill, Knockagh, and Sallagh Braes, Co. Antrim, S.A.S.; Garron Point, Co. Antrim, and Benevenagh, Co. Derry, Dr. Shoolbred, 1893. First recognised as Irish from specimens collected on Cave Hill by R. L. P. in 1886.

H. flocculosum, Back.—Basalt rocks of Sallagh Braes, Co. Antrim, S.A.S., 1886. A new county record.

H. bifidum, Tausch.—Benevenagh, Co. Derry, Dr. Shoolbred, 1893. First Irish record.

H. schmidtii, Tausch.—Granite cliffs of Bencrom, Mourne Mountains, S. and P. The only station in district 12 at present known.

H. friesii, Hartm., var. **stewartii**, Hanb.—A remarkable form found sparingly in Tollymore Park, and abundantly on rocky banks of the Bann above Hilltown, S. & P. The only British station. This plant was recorded in "Botany of the Mourne Mountains" as *H. friesii*.

H. hibernicum, Hanb.—Very sparingly on rocks at Broughnamaddy, Mourne Mountains; H. C. Hart, 1883; S. A. S., 1888; and S. & P., 1890. This plant was mentioned, under "*H. vulgatum*," by Mr. Hart in *Proc. Roy. Ir. Acad.* in 1884. It was recorded in *Jour. Bot.*, 1886, and in *Flora N.E.I.* in 1888 as *H. argenteum*. Mr. Hanbury has shown that it is distinct, and has named it as above. The only other certainly ascertained station is in Donegal (Hart).

H. crocatum, Fries.—Cliffs of Pigeon Rock Mountain, Mourne range, and by Shimna and Spinkwee Rivers, Tollymore Park, S. and P.

H. auratum, Fries.—Frequent throughout the Mourne Mountains, S. & P. Many of the plants hitherto classed under *H. corymbosum* must now be referred to this species. In Antrim it has been found on shores of Lough Neagh at Cranfield, S.A.S., and cliffs by the sea at Cushendun, R. L. P.

Lobelia Dortmanna, Linn.—Abundant in lakelet on summit of Binnagee (1,100 ft.), near Carnlough, Co. Antrim, R. L. P.

Vaccinium Oxycoccos, Linn.—Marsh at Saul Camp, Downpatrick, also by a lakelet near Carnlough, Co. Antrim, and on margins of Lough Ouske, Co. Derry, R. L. P. New to Antrim.

Mertensia maritima (Linn.), Don.—Refound on strand between Portrush and Portstewart, Co. Derry, by Mrs. Leebody, 1893.

Myosotis collina, Hoff.—Shane's Castle, Co. Antrim, R. L. P., 1891. Sandy warren at Portstewart, Co. Derry, Miss Davies, 1890. Not previously recorded for Derry.

Hyoscyamus niger, Linn.—Plentiful on distillery rubbish heap at Comber, Co. Down, S.A.S. Imported with grain.

Orobanche minor, Sutt.—Abundant in a field by the sea at Craigavad, H. C. Marshall, 1892. Imported with seed.

Linaria repens, Ait.—By a *lapsus* this was printed in *Flora N.E.I.* as *L. minor*. It is abundant near Killowen, and on the lower slopes of Spelga Mountain, Co. Down, S. and P.

Melampyrum pratense, Tournefort, var. **montanum**.—Frequent in Mourne Mountains at 1,400 to 2,394 feet, S. and P.

Erinus alpinus, Linn.—Wall of Downpatrick Goal, R. Ll. P., 1890. A plant of the Pyrenees established here, but not found elsewhere in Ireland.

Veronica polita, Fries.—Waste ground near the tramway station, Bushmills, Co. Antrim, S.A.S., 1893.

Mentha sativa, Linn. var. **paludosa**, Sole.—Limavady Junction, Co. Derry, Mrs. Leebody, 1893 (fide A. Bennett).

[*Calamintha officinalis* has been long extinct at our only station, Glendun River.]

Lamium hybridum, Villars—Fields at Killowen and Glasdrumman, Co. Down, S. and P.

Galeopsis speciosa, Miller.—Field at Six Road Ends, Conlig, Co. Down, S.A.S., 1893. Garron Point, Glenariffe, and Cushendun, Co. Antrim, R. Ll. P., 1892.

Stachys betonica, Linn.—Refound by the Bann at Kilrea, Co. Derry, Mrs. Leebody, 1893.

Utricularia intermedia, Hayne.—Peat bog at Rasharkin, Co. Antrim, “Cybele Hibernica.” Overlooked when compiling the “Flora N. E. I.”

[*Primula veris*, Linn., must be removed from list of native plants. It is not now found at Rostrevor.]

Hottonia palustris, Linn.—Everogue Bridge, as ascertained by Mr. Praeger, is at Crossgar, not Downpatrick, and Mr. Praeger finds that the plant still grows in this, its original station.

Anagallis arvensis, Linn., var. **cœrulea**, Schreb.—Wayside at Stranmillis Road, Belfast, Rev. John Andrew.

Beta maritima, Linn.—Portavo and Millisle, Co. Down, also Whitepark Bay, and Kenbane Head, Co. Antrim, R. Ll. P. Downhill, Co. Derry, Mrs. Leebody, 1891. No previous record for Derry.

Atriplex farinosa, Dumort.—Redbay, Cushendun, and Bushfoot, R. Ll. P. New to north Antrim.

Polygonum Rali, Bab.—Redbay and Ballycastle, R. Ll. P., 1890.

Callitriche autumnalis, Linn.—In the river at Bushfoot, Co. Antrim, 1888, and in the Bann at Toome, 1893, R. Ll. P. New to Co. Antrim list.

Salix purpurea, Linn.—Marsh near Moneyscalp, and roadside east of Crotlieve Mountain, Mourne range, S. and P. Near Holywood, and Craigavad, Co. Down, R. Ll. P. New county records, but stations for this ornamental willow are often suspicious.

Populus tremula, Linn.—Native on cliffs south of Blue Lough, Mourne Mountains, S. and P. New to Down flora.

Orchis pyramidalis, Linn.—About a half-dozen of plants on chalk rubbish at Magheragall quarries, Lisburn, Co. Antrim, R. Ll. P., 1888. In some abundance at east end of Magilligan Strand, Co. Derry, Mrs. Leebody, 1892.

Gymnadenia albida (Swartz), Rich.—Conlig Hill, Co. Down, R. Ll. P., 1891. Glenariffe, Co. Antrim, Rev. S. A. Brennan. This plant was found by Rev. W. M. Hind on Squires's Hill, near Belfast, more than thirty years ago; it has been refound there by Mr. W. H. Patterson in 1893.

Habenaria viridis, R. Br.—Kilbroney valley, and shore north of Annalong, Co. Down, S. and P.

H. bifolia, R. Br.—Kilbroney and Annalong, S. and P. By Enagh Lough, Co. Derry, Mrs. Leebody, 1892.

Listera cordata, R. Br.—Many stations in the Mourne Mountains, S. and P.

Neottia nidus-avis, Linn.—Wood above Bellarena station, Co. Derry, Mrs. Leebody, and B.N.F.C.

Spiranthes Romanzoviana, Cham.—A number of plants by the Bann, near Kilrea, Co. Derry, Mrs. Leebody, July, 1893. Northern botanists were startled by Mr. Praeger's discovery of this extremely rare orchid in Armagh. The announcement that Mrs. Leebody had met with it in County Derry came, therefore, as a further surprise. The flora of the north-east has been most unexpectedly enriched by this valuable addition.

Sparganium minimum, Fries.—In a small lake near Warrenpoint, Down, S. and P. Bog-holes west of Scawt Hill, Co. Antrim, R. Ll. P., 1887.

Typha angustifolia, Linn.—In Lough Neagh at the entrance of the Lagan canal, Co. Down, R. Ll. P., 1892.

Potamogeton nitens, Weber.—Annsboro Lake, Co. Down, and in the Sixmilewater near Antrim, S.A.S.

Cladium Mariscus (Linn.), R. Br.—Not yet extinct in Co. Down. A few plants still linger on marshy margin of Altnadua Lake, near Castlewellan, S. and P.

Carex muricata, Linn.—Marshy pasture between Springfield Road and the Forth River above Clowney Bridge, Belfast, Richard Hanna, 1893. Owing to encroachments of the builder, this plant will shortly disappear from this, its second station in the north of Ireland.

C. stricta, Gooden.—Abundant and luxuriant on several spots around Portmore Lough, Co. Antrim; also on islet on the Antrim side of Lough Beg, and on the Derry side of the Bann below Toome, R. Ll. P., 1893. These records make an addition to the flora of Derry, and remove all doubt as to the correctness of Templeton's statement of its occurrence at Portmore, almost a century since.

C. aquatilis, Wahl.—Plentiful in a deep drain in Shane's Castle Park, R. Ll. P., 1891. There is no other station for this sedge in the north-east. It was only recognized as an Irish plant in 1883. See Mr. A. Bennett's paper in *J. N.*, 1892.

C. pallescens, Linn.—Tollymore Park, Co. Down, S. and P.

C. limosa, Linn.—Marsh at Saul camp, near Downpatrick, 1889, and margin of Lough Ouske, Co. Derry, R. Ll. P., 1892.

Alopecurus pratensis, Linn.—Donaghadee, Co. Down, S.A.S., 1892.

Millium effusum, Linn.—South of Rostrevor, Co. Down, S. and P.

Avena pubescens, Linn.—Dry places by the shore at Craigavad, Co. Down, R. Ll. P., 1893. The only certain Co. Down station.

Alra flexuosa, Linn.—Abundant in Mourne Mountains, S. and P.

[*Sclerochloa procumbens* has been destroyed in the small spot it occupied at Belfast by the paving of Albert Quay, where it formerly grew in a dense patch].

Schlerochloa rigida, Linn.—Sea-walls at Killough and Ardglass, Co. Down, 1892, and at Magheramorne, Co. Antrim, 1893, R. Ll. P. New to Co. Antrim.

Festuca sylvatica, Villars.—Abundant by the Shimna River in Tollymore Park, S. and P. It is thus certainly a Co. Down plant, but cannot now be found at Rostrevor.

Equisetum hyemale, Linn.—Several stations in the Mourne Mountains, S. and P. Banks of the Lagan at Edenderry, Co. Down, R. Ll. P., 1892.

Lastrea filix-mas (Linn.) Pers., var. **abbreviata**.—Eagle Mountain, Mourne Mountains, S. and P. Quite distinct as a variety.

[*Asplenium Adiantum-nigrum*, var. *acutum*, Bory. Through the researches of Mr. Praeger the mystery connected with Sherard's record of this fern has been elucidated. Original specimens are preserved in the Herbarium Sloaneum in the British Museum, and in the Sherardian Herbarium at Oxford. The former specimen has been examined by Mr. Praeger, and the latter, on his behalf, by Prof. Vines. They prove to be referable to a barren plumose form of *Athyrium Filix-femina*, practically identical with the form known to fern-growers as "*kalothrix*"—S. and P.

Osmunda regalis, Linn.—The Royal Fern still lingers by Lough Neagh at Shane's Castle, R. Ll. P., 1891.

Chara contraria, Kuetz.—Brackish pools at Limavady Junction, Co. Derry, 1889, and Clandeboy Lake, Co. Down, 1891, R. Ll. P. An addition to the Ulster flora.

IRISH BUTTERFLIES.

The Lepidoptera of the British Islands. By C. G. BARRETT, F.E.S. Vol. I., Rhopalocera. London, L. Reeve & Co., 1893. Price 12s. Large edition, with coloured plates, £2 13s.

A Catalogue of the Lepidoptera of Ireland. By W. F. DE V. KANE, M.A. *Entomologist*, 1893. (Introduction and Rhopalocera in March to September parts.)

Entomologists in Ireland will heartily welcome the appearance of these two works. The former is by one of the most experienced of British lepidopterists, who, during his residence on this side of the channel, did much to increase our knowledge of Irish insects. We could wish that a fuller account of the structure of butterflies and moths, with some notes on comparative insect anatomy, were to be found in Mr. Barrett's introduction. For instance, the student is not told that the sucking-trunk of a moth is formed by the modification of a pair of jaws. A distinct improvement upon the order of our usual British lists is adopted by Mr. Barrett in placing the "*Blues*" (*Lycaenidae*) immediately after the "*Whites*" (*Pieridae*). We hope, however, that it will not be very much longer before workers at the British lepidoptera begin to use the late Mr. Bates' natural order of the butterfly-families, with the *Danaida* at the head, and the *Papilionidae* near the end, just before the "*Skipper*s" (*Hesperiidae*). This order has been in use by workers at exotic butterflies for about twenty years past.

Mr. Barrett's descriptions of the various species and their varieties are excellent. We are glad to see that he does not think it necessary to coin a number of varietal names, though he describes and figures many striking aberrations, several of which are from Ireland. Notable among these is Mr. Russ's dark form of *Pieris napi*, from Sligo, approaching the continental alpine var. *bryoniae*. Mr. Barrett has collected a mine of facts on the subject of variation, but he leaves it to others to propound theories in explanation thereof. From his own observations and the scattered records of many workers, he gives full accounts of the habits, time of appearance, &c., of each species, as well as details of the preparatory stages. Lists of past and present localities are full enough to enable us to trace the varying range of each insect. This, alas! in many cases has become more and more restricted, and it is to be feared that two of the finest English butterflies—*Aporia crategi* and *Lycæna acis*—have gone the way of *Polyommatus dispar*.

Four species of butterflies are given established places on the British list by Mr. Barrett, on the strength of captures during the last few years. The most striking is an American immigrant—*Danaï archippus*—which has occurred in southern and south-western England, and South Wales, and might well be expected to visit Ireland occasionally. The two new "Blues"—*Lycæna belica* and *L. argiades*—are south of England species, and might very likely be found near the south coast of Ireland. The new "Skipper"—*Hesperia lineola*—seems to have its headquarters in East Anglia, and is hardly likely to occur with us. The British list now numbers sixty-eight species, but one of these is certainly, and two others are probably, extinct.

Of these Mr. Kane inserts forty in his new Irish list. The necessity for a revision of Birchall's list of 1866 has long been felt, and we rejoice that the naturalist best qualified for the task has now begun it. Not only have numerous important, but scattered, records, and a vast amount of unpublished material to be added, but not a few erroneous entries have to be expunged. Mr. Kane tells us, in his introduction, that he has clear evidence of the wrong determination of certain of the species recorded by Birchall. As he remarks, it is of the greatest importance that these should be noted and struck off, that the workers of the future may have a good foundation on which to build. Though better known than any other group of insects, there is yet much to be discovered about Irish lepidoptera.

Forty-three species of butterflies were given as Irish by Birchall in 1866. Four of these—*Aporia crategi*, *Vanessa polychloros*, *Lycæna astrarche* (*agestis*), and *L. corydon*—were withdrawn by him in 1873, but two others, *Vanessa c-album* and *Syrichthus malvæ*, were added. Both of these however are omitted by Mr. Kane; the latter appears to have been wrongly identified, while the former was not captured, only observed—at a distance of several yards, as we have been told by one who was in company with the observer.

Another species in the 1866 list—*Nemeobius lucinia*—which rests upon unlocalised specimens in the Dublin University Museum, is also left out.

In place of these withdrawals, Mr. Kane has two species to add, both "fritillaries," *Argynnis selene*, recorded by Mr. Sinclair several years ago, and *A. adippe*. The latter, taken in Co. Galway, by Mr. R. E. Dillon, of Clonbrock, is a most interesting addition to our fauna. (Mr. Dillon has made still more startling discoveries among the moths, to which we hope soon to refer.) We noticed a record of *A. adippe* from Galway by Mr. G. A. Harker in the *Ent. Record* for October, 1892, and are glad to see the locality confirmed on such good authority as Mr. Kane's. Ranging, as it does, nearly all over England and into South Wales, this insect probably awaits collectors in other Irish localities. Thus Mr. Kane gives us forty species as Irish, and the recent discovery of *Pieris daphidice* (*I. Nat.*, December, 1893), raises this number by one, though this butterfly can be only regarded as a chance visitor, together with *Colias hyale*, *Argynnis latonia*, and *Vanessa antiopa*.

Five butterflies—*A. latonia*, *Melitæa athalia*, *Erebia epiphron*, *Lycæna ægon*, and *Hesperia thaumas*—have not been taken or seen by Mr. Kane or any of his correspondents, and still rest on Birchall's records of 1866. Though there is no doubt as to the correctness of these records, the re-discovery of the species is desirable.

The insect to which Mr. Kane devotes most space is *Melitæa aurinia* (*artemis*) of which he distinguishes two Irish varieties, which he names *præclara* and *scotica* (the latter form occurring also near Aberdeen and having received this name in recent English lists). Birchall's variety, *hibernica*, described in 1873 from Westmeath specimens, is practically abolished by Mr. Kane, who says that he has found only one example agreeing closely with Birchall's description, and that all Irish specimens come short of the size given by Birchall. It must be remembered, however, that in his time variety-naming had not become the fine art which it is at present. Birchall defined generally his var. *hibernica* as differing from the English insect in having "the fulvous spots largely replaced by white or cream-coloured blotches." This is a characteristic of both Mr. Kane's varieties, and it seems doubtful if new names were necessary.

In common with all naturalists in the country, we shall watch with interest the continuation of Mr. Kane's work, for which we owe him a debt of gratitude, and we hope soon to summarise his further publications. The appended list of Irish butterflies, abstracted from his, with a few supplemental localities will, no doubt, interest our readers, and will, we trust, lead them to consult for themselves his excellent work and that of Mr. Barrett.

In the list as given here, we venture to adopt the modern order of the families:—

SATYRIDÆ.

Erebia epiphron, Knoch.—Croagh Patrick.

Pararge egeria, L. } Common everywhere.
P. megera, L. }

Satyrus semele, L.—Maritime counties.

Epinephile ianira, L.—Common everywhere.

E. tithonus, L.—Southern counties.

E. hyperanthes, L.—Widespread; often common.

- Canonympha typhon*, Rott.—Mountains and moors of Cos. Kerry, Cork, Mayo, Sligo and Donegal; midland bogs.
C. pamphilus, L.—Widespread and common.

NYMPHALIDÆ.

- Argynnis selene*, Schiff.—Has been taken once in King's Co.
A. latonia, L.—Once at Killarney.
A. aglaia, L.—Occurs round the coast:—Derry, Cos. Antrim, Down, Dublin, Wicklow, Waterford, Cork, Kerry, Galway.
A. adippe, L.—Co. Galway.
A. paphia, L.—Generally distributed in wooded districts.
Melitæa aurinia, Rott.—Widely distributed; most plentifully over the south of Ireland, but local:—Cos. Dublin, Wicklow, Carlow, Westmeath, Queen's Co., Waterford, Cork, Kerry, Limerick, Clare, Galway, and Sligo.
M. athalia, Rott.—Killarney.
Vaenassa urticae, L.—Common everywhere.
V. io, L.—Common in parts of the south, rare in Ulster.
V. antiopa, L.—A few occurrences:—Belfast; Co. Tyrone; Co. Kerry.
V. atalanta, L. } Fairly common in the three southern provinces, rarer
V. cardui, L. } in Ulster.

LYCÆNIDÆ.

- Thecla betulae*, L.—Munster; Co. Galway.
T. quercus, L.—Cos. Dublin, Wicklow, Cork, Kerry, and Galway.
T. rubi, L.—Southern counties, often abundant; Co. Armagh.
Polyommatus phlaeas, L.—Widespread; common in the south.
Lycæna ægon, Schiff.—Wicklow; Rostrevor.
L. icarus, Rott.—Widespread and common.
L. argiolus, L.—Generally distributed in wooded districts, where Holly is plentiful.
L. minima, Fues.—Widespread, but local.

PIERIDÆ.

- Pieris brassicæ*, L.—Widespread and common.
P. rapæ, L.—Widespread, but less common.
P. napi, L.—Widespread and common.
P. daphidice, L.—Once in Co. Wexford.
Euchloe cardamines, L.—Generally distributed.
Leucophasia sinapis, L.—Local:—Enniskillen; Co. Sligo; Co. Galway; Queen's Co.; Killarney.
Colias hyale, L.—Migrants occurred in the south in 1868.
C. edusa, Fab.—Occurs in certain years, generally in the south.
Gonopteryx rhamni, L.—Very local:—Co. Longford; Co. Galway; Killarney; Limerick.

HESPERIIDÆ.

- Nisoniades tages*, L.—Galway; Enniskillen; Co. Clare.
Hesperia thaumas, Hufn.—Cos. Wicklow and Cork.
H. sylvanus, Esp.—Wicklow, Killarney.
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AMERICAN BIRD-VISITORS TO IRELAND.

BY W. E. PRAEGER, KEOKUK, IOWA.

VI.—THE AMERICAN GOSHAWK (*Accipiter atricapillus*).

THIS American bird has twice occurred in Ireland. One was shot in February, 1870, in the Galtee Mountains, Tipperary, and in the same year another was obtained in King's County. In the previous year it had been noted in Forfarshire, this being its only occurrence on the Sister Island.

The Goshawk is a winter visitor to the United States, and but few instances are recorded of its breeding south of the British possessions, though it does so regularly in some localities. Near Keokuk it is a rare winter visitant, and I have seen only about five birds of this species obtained near here in my ten years' observation. Early in February, 1888, one was shot by a farmer while it was devouring a chicken it had just killed. It was a very large and handsome female bird, and the most beautiful hawk I ever saw. The following winter two more were killed, which I saw after they had been mounted. A year later, I find my last note on this bird. On the 19th December, 1889, a friend of mine was out after Wild Turkeys, in some rough wooded land, a few miles north of this city. As he was standing on the edge of a small clearing he heard the crows making a great noise behind him, as though they were at their favourite amusement of mobbing an owl; a moment later, two hawks dashed out of the timber and over his head, and he brought them down handsomely with a right and left. The birds proved to be a splendid pair of Goshawks, and I even now break the tenth commandment almost daily as I pass the store window where they are displayed.

The Goshawk is perhaps the most rapacious of birds of prey, and were it more common in the settled parts of the country, the farmer would have a heavy score against it. But, save the wandering trapper, few white men know the Goshawk in his summer home, and neither Indians nor Eskimo are noted as poultry-fanciers. But if a Goshawk appears near a farmhouse trouble is sure to follow. For ferocious daring it has no equal among birds. Several cases are recorded of this bird's pursuing fowls even into dwelling-houses, where they sought in

vain the protection of man; of game just shot, carried off before the eyes of the sportsman; of newly-killed fowl carried away almost from out the hands of the poulterer. Bendire gives a case where he gave a Goshawk, that made a dash at some chickens, a dose of light shot; the wounded bird made off, but he had hardly slipped a new cartridge into his gun before it was back again after the chickens, but only to get a load of heavier shot that ended its career.

The Goshawk has strongly developed that characteristic human trait of killing just for the fun of the thing. One has been known to kill and tear to pieces five Ruffed Grouse in a single forenoon. Audubon records seeing one attack a flock of Grackles that were crossing a river, and strike five down before they could gain the shelter of the woods; the hawk then turned, and picking the disabled birds one by one from the water, carried them to a chosen spot on shore.

The contents of this bird's crop and stomach usually bear testimony to its destructiveness. By "destructiveness" we mean that it kills and eats some of those species that man considers of economic importance to himself—or in other words, *Accipiter atricapillus* comes into direct competition with *Homo sapiens* in the struggle for existence. The stomach is mostly well filled with remains of Grouse, Ptarmigan, fowl, Rabbits, or Squirrels. More rarely "vermin" are found, such as Mice, locusts, or beetles, while one occasion is noted when the bird had made a meal of a Weasel.

This hawk places its nest in a tree, usually at from 20 to 50 feet from the ground; it seems indifferent as to the species of tree selected. The nest is a rather rough and bulky affair, built chiefly of sticks. The eggs are from two to five in number, bluish white and unspotted, though sometimes slight brownish stains are noticeable. If the nest is approached, the bird will often defend it with great courage.

The Goshawk is readily distinguished from any other bird. Though such a good flyer, its wings are very short, at least for a hawk. Its size and proportions are unmistakable; a female will measure:—Length, 24 inches; wing, 14 inches; tail, 12 inches; as usual among hawks the male is somewhat smaller. It is not so easy, however, to distinguish the American from the European Goshawk, and I should want to carefully compare a specimen with other skins before deciding to which

species it belonged. The American bird has the back greyer and head blacker than the European, and the feathers of the breast and flanks are irregularly marked where, in the European bird, they are distinctly barred. Birds found west of the Rocky Mountains are very dark-coloured, and are usually considered as deserving recognition as a sub-species (*striatulus*).

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations to the Gardens include a monkey from S. Cunningham, Esq.; six Demoiselle Cranes from Dr. C. B. Ball; a Muscovy Duck from Mr. Evans; and a pair of Chilian Pintails from H. M. Barton, Esq.

The young female Chimpanzee, mentioned by Dr. V. Ball in his article in our January number (p. 3), did not long survive "Johnnie." Another female specimen has been acquired by purchase; she is named "Bella," and appears to be of a different race to her predecessors in Dublin, having a more hairy head.

Other recent purchases comprise a genet, a pair of silver-grey Rabbits, a pair of wild Turkeys, three Magellan Geese, and a male Yak.

2,320 persons visited the Gardens in January.

The Annual Meeting of the Society was held at Leinster House on January 30th. The Report then presented shows that the past year has been a successful one, having shown a considerable increase in the number of visitors, though there has been a falling off in the number of members. A most satisfactory addition to the buildings during the year has been the new outdoor aviary, which affords much pleasure to the birds by its spacious proportions, as well as to the visitors, who can watch their flight. The monkey-house is now undergoing improvements. Appended to the report are notices by Dr. V. Ball on lion-breeding in the Gardens and on lion-tiger hybrids.

DUBLIN MICROSCOPICAL CLUB.

DECEMBER 21ST.—The Club met at Dr. McWEENEY'S, who showed plate and tube cultivations (on obliquely solidified gelatine) of a micro-organism, the colonies of which possessed a most brilliant red colour, brighter even than that of *Bacillus prodigiosus*, the classic example of bacterial chromogenesis. The organism had been obtained from cultures of the pus of a large hepatic abscess. The patient was a young girl who had died of pyæmia in the Mater Misericordiæ Hospital. There was also found in the pus a second organism, the colonies of which were of a deep yellow colour. Neither the red nor the yellow organism liquified the gelatine; both grew much better at 37° C. than at 20° C. The development of pigment however was not observed at the higher temperature, nor in the absence of a large supply of air; but attained its optimum on gelatine plates that had been kept at room temperature nearly a month. The red organism refused to develop on potato. It consisted of excessively minute cocci, often in pairs. The individuals were decidedly smaller than *Streptococcus pyogenes*. Minute abscesses in the lungs and spleen of

the patient contained similar cocci in close-packed colonies. It would be necessary to experiment further with this organism and its companion (a much larger coccus) before their biological position and their role in this particular case could be ascertained.

MR. F. W. MOORE showed *Dendrochium rubellum*. This fungus had not previously been recorded from Glasnevin. It was found growing on the decaying pseudo-bulb of an unnamed species of *Catasetum* which had been imported from Brazil. Specimens were sent to Mr. Massee, who identified it as the above-named species.

PROF. T. JOHNSON showed *Conchoecelis rosea*, Batt., a perforating red alga, growing in the razor-shell (*Solen vagina*), &c. The specimens were found by the exhibitor in April this year on the shores of Dublin Bay. The genus was founded in 1892 by Batters, on material gathered at Milfort, Firth of Clyde, is the only floridean member of the "perforating algae", and is regarded as a member of the Bangiaceae. He also exhibited *Schmitziella endophlea*, Born. & Batt, an encrusting member of the Corallinaceae, found growing in the substance of the cell-wall of *Cladophora pellucida* on the coast of Clare, three miles north of Kilkee. The monotypic genus represented by this endophytic red alga was founded by Bornet and Batters in 1892, and was recorded by them from the north coast of France, the south-west and west coasts of England. *Conchoecelis rosea* and *Schmitziella endophlea* are interesting additions to the marine flora of Ireland. A type-specimen of the latter, and the only existing illustrations of both, which the exhibitor owed to the kindness of Mr. Batters, were also shown.

MR. M'ARDLE exhibited a specimen of *Metzgeria conjugata* (Dill.) Lindberg, showing the autœcious inflorescence (*i.e.*, antheridia and the curious echinate calyptra on the same frond). The specimens of this rare and curious plant he collected in Ballyhaise wood, Co. Cavan, in October, 1893. This is a new locality for the species. It is interesting to note that this is the only species of *Metzgeria* which has the autœcious inflorescence; all the others known are diœcious.

JANUARY 18th.—The Club met at Dr. W. FRAZER's, who showed a specimen of sandstone with aggregated white accretions, usually of rounded form, the matrix being red; both materials were similar except in colour.

MR. GREENWOOD PIM showed specimens of *Microsphaeria comata* obtained from leaves of *Euonymus* on the Slane excursion of the Dublin Naturalists' Field Club last September. This species, which is new to Ireland, is remarkable for the great length of its conceptacle appendages.

MR. F. W. MOORE exhibited *Nectria bicolor*, B. and Br., an interesting and pretty fungus, which had been found growing on *Cœlogyne pandurata* in one of the hottest greenhouses in Glasnevin. *Cœlogyne pandurata* is a native of the swamps of North Borneo.

PROF. COLE showed sections of an iron-stained chert with brecciated structure. These were cut from a stone found six feet down in a bog in Co. Galway, the object being recognized by the local workmen as being of a most unusual character, and probably foreign to the district. The stone was brought for examination in Dublin by the Ven. Dr. Tait, Archdeacon of Tuam. One section has revealed a minute body that is probably a radiolarian, while organic structures occur in others. But the material is unsatisfactory owing to the amount of opaque hydrated iron oxide that it contains. Prof. Cole suggested that the stone was carried from some distant mineral vein by an ancient inhabitant of the district, and was lost in the bog, where it became embedded.

PROF. T. JOHNSON exhibited a fertile specimen of *Streblonema simplex*, (Crm.) Holmes and Batt., a brown alga discovered by the Cronans in 1867 on the north-west coast of France, subsequently by E. M. Holmes on the south coast of England, and by himself in September, 1891, at Kilkee (Co. Clare), and at Castletown-Berehaven (Bantry Bay) in May, 1893. The species is figured by Holmes in the *Journal of Botany* for 1887 (Tab. 274, f. 161). *S. simplex* forms small dark brown patches on *Codium tomentosum*, into which it sends creeping root-like filaments. The sporangi (plurilocular only known) are stalked, conical, obtuse, and confined to the basal part of the epiphytic tufts.

DR. M'WEENEY showed a number of curious pear-shaped hyaline structureless bodies which he had seen in the body cavity and muscles of a dead water-flea that had occurred in the sediment of Lough Dan water collected for analytical purposes last December. The greater part of the animal was filled up with these bodies, the regularity of whose shape and their tendency to be connected in pairs strongly suggested an organic origin. Their length was about 10-12 microns, their outline highly refractive, their narrow ends frequently united. He suggested that they might possibly be spores of some species of parasitic protozoon, and be comparable with the "pseudonavicellæ" of Gregarines and the pole-capsules of Myxosporidia. Numerous species of the latter group have recently been described, chiefly by Thélohan, as living in water-fleas, and these spores might possibly prove to belong to one of them.

MR. DUERDEN exhibited specimens and sections of a new species of *Zoanthus* from the Bay of Bengal. The species is closely allied to *Z. sociatus*, Ellis, which is only known from the West Indies. The polyps in the species exhibited are club-shaped when contracted, and grow in clusters, the buds springing from the narrow bases of the polyps themselves. The body wall is smooth, and in some so transparent that the gonads and mesenteries can be seen through. The ectoderm is vacuolated, and has a "cuticula" on the outside, of the same nature as mesogloea. This, along with the brown cuticle, is very dendriform in appearance. In this character and also in the basal canals of the mesenteries the species differs from its ally *Z. sociatus*.

MR. M'ARDLE exhibited a fertile specimen of *Scapania aspera*, Muller and Bennett, which he collected in some quantity in the oak-wood, near Ballyhaise, Co. Cavan; he also gathered the plant sparingly on Slieve Glah, a small mountain near Cavan, in October, 1893. These are the first Irish stations recorded for this liverwort, which is an addition to our flora. Mr. W. H. Pearson, who verified the Cavan specimens, collected it on Tower Hill, Abergele, Denbighshire; it is also recorded from several localities in England and on the continent (Sweden, Switzerland, Germany, Austria, and Italy.) Mr. M'Ardle also exhibited an excellent figure of the plant by Mr. Pearson, published in the *Journal of Botany*, vol. xxx., p. 353, tab. 329, December, 1892, and mounted specimens showing the habit of growth of the plant.

BELFAST NATURALISTS' FIELD CLUB.

JANUARY 16th.—The President (MR. WM. SWANSTON, F.G.S.) in the chair. The following papers were read:—Relative Antiquity of Rath, Cromleac, and Tumulus, as evidenced by some remains near Dromore, Co. Down, by JOHN M. DICKSON; Pre-historic Forts and Rathes in the City and Vicinity of Belfast, by FRANCIS JOSEPH BIGGER; Notes on Forts in the Townland of Greenagh, near Downpatrick, by JOHN RUSSELL, C.E.

DUBLIN NATURALISTS' FIELD CLUB.

FEBRUARY 13th.—The President (Mr. G. H. CARPENTER) gave a paper on the Irish Phalangida or "Harvestmen," illustrated by microscopical preparations shown in the optical lantern. The paper will shortly be published in the *Irish Naturalist*.

Dr. E. J. M'WEENEY gave an account illustrated by test-tube specimens and microscopical preparations of the pure cultivation of Moulds, stating that he hoped by this means to bring to light a second method of reproduction in species where only one is at present known. A paper on the subject will appear in the *Irish Naturalist*.

A discussion followed, in which Mr. J. E. DUERDEN, Prof. COLE, and Mr. H. RAMAGE took part.

Mr. H. L. JAMESON asked assistance from members of the Club in investigating the Irish Bats.

LIMERICK NATURALISTS' FIELD CLUB.

JANUARY 16th.—The Annual Meeting was held at 97, George-street. The Report presented by the Committee showed the Club to be in good condition, both as to membership and finances. The Officers for 1894 were elected as follows:—President, Mr. A. MURRAY; Vice-Presidents, Dr. FOGERTY and Mr. E. TAYLOR; Treasurer, Mr. J. STEWART; Secretary, Mr. F. NEALE; Members of Committee, Mrs. R. GIBSON, Mr. H. MARTIN, and Mr. R. D. O'BRIEN. A series of very interesting lantern transparencies, kindly lent for the occasion by Mr. G. H. Carpenter of Dublin, and Mr. R. Welch of Belfast, were exhibited and explained, the subjects thus dealt with being Lepidopterous Larvæ, Birds' Nests, Geological Stratification, &c., Foraminifera and Diatoms.

NOTES.

BOTANY.

MUSCINEÆ.

Hepatics and Mosses from the Dundalk District.—The pleasant time spent on the long excursion last year will still be fresh in the memory of the members of the Dublin Naturalists' Field Club who took part in it. My own principal object was to investigate the mosses and hepatics of the district, no easy matter when the country and scenery is new, not to mention the interesting antiquities on the route, which claimed a large share of attention. I have before me in my notebook a rough sketch of the famous cromleac and dolmen of Ballymascanlan; these alone were worth going to see. The cover-stone of the cromleac measures twelve feet in length by six feet in breadth, and is estimated to weigh fifty tons, and about eight feet is the height of the supporting stones. Slieve Gullion looked dry and barren, so those interested in cryptogams collected along the lower slopes, which were more sheltered and likely to be productive of the plants we were in search of. Amongst others I succeeded in gathering *Cephalozia Lamersiana*, Huben, *Plagiochila spinulosa*, Dicks, *Nardia hyalina*, Lyell, and

Blasia pusilla, Linn. Amongst the *Cephalozæ* I detected a few stems of *Scapania umbrosa*, Schrader, which must grow in some quantity at this station. These are rare and interesting liverworts, probably new to the locality. Amongst the mosses the best finds were *Orthotrichum crispum*, Hedwig, and *Hypnum scorpioides*, Linn. From the road near St. Patrick's Bridge we ascended Carlingford Mountain; piloted by Mr. Lloyd Praeger, we kept close to the course of a small stream. Amongst the rocks in sheltered places he pointed out to us the rare *Polypodium Phegopteris*, L., *Hymenophyllum Wilsoni*, Hook., &c. At the summit we had the benefit of Professor Cole's excellent lecture on the geology of the district; the spot was well chosen, as it presented ample material for demonstration. Amongst the liverworts collected was a fine purple form of *Scapania nemorosa*, Dumort. This plant is often referred to *Scapania undulata*, L., wrongly, I think; or there may occur purple forms of both species. *Riccardia multifida* grows sparingly in boggy places. On the last day of the excursion we descended the steep slopes of Ferry-hill, and crossed at Narrow-water to Major Hall's demesne. On the side of a bank near the pathway I gathered *Nardia crenulata*, Smith, *N. hyalina*, Lyell, and the obtuse-lobed form of *Jungermania turbinata*, Raddi. The total number of mosses collected or noted by me is 26; amongst the scarcer in the district I may mention *Tortula fallax*, Hedwig, on a bank by the roadside near Newry; *Amblystegium serpens*, Dill. and *Sphagnum rubellum*, Wils. on Carlingford Mountain. Of Hepaticæ I gathered 20 species; I have mentioned those which I believe are rare or new in the district. These numbers fall short of what one would expect for three days' collecting. I noted that on Slieve Gullion trees and wood of any sort are very scarce; it is on the fallen and decaying logs in sheltered, moist spots that the rarest liverworts and mosses luxuriate, and there we find them so abundant in the moist warm glens of the counties of Wicklow and Kerry, where in the same space of time I could at least have collected two-thirds of the known Irish liverworts and mosses. The labours of Mr. Templeton, of Belfast, and Dr. D. Moore amongst cryptogams in the northern counties are well known; it only remains for me to notice those of the present day. It is worthy of note that the copious and complete lists of these plants published from time to time by Mr. S. A. Stewart, of Belfast, the Rev. H. W. Lett, of Loughbrickland, and the Rev. C. H. Waddell, of Saintfield, Co. Down, show these three workers to be possessed of rare discriminating power, to acquire so large an amount of knowledge under such natural difficulties of climatal conditions of plant-life.—D. M'ARDLE, Glasnevin.

A Moss (*Hypnum confervoides*, Brid.) new to Ireland.—Amongst a day's gatherings of Mosses and Hepatics made by me in August, 1893, in Altadore Glen, Co. Wicklow, I have found some fine patches of *Hypnum confervoides*, Brid., which is, in the words of Dr. Braithwaite, who confirms the find, "a good addition" to the Moss Flora of Ireland. So far as I am aware there is no previous notice of this plant having been found in the island.—H. W. LETT, Loughbrickland.

ZOOLOGY.

PYCNOGONIDA.

***Pallene brevirostris*, Johnst., and *Ammonothea echinata*, Hodge, in Dublin Bay.**—A collection of marine invertebrates, got by Dr. Scharff at the North Bull, after the severe gales of December last, included female specimens of these two pycnogons. They have not before been obtained on the Irish coast, though recorded from the shores of Norway, Holland, France, and Great Britain, the latter species occurring also in the Mediterranean.—GEO. H. CARPENTER.

Anoplodactylus petiolatus, Kr., off the South-West Coast.

—In my paper on Irish Pycnogonida (*Sci. Proc. R.D.S.*, vol. viii., p. 197), I was able to record only a single female of this species, from Loughrosmore Bay, Co. Donegal. Mr. J. E. Duerden has lately found several examples of both sexes which were dredged by the "Harlequin" in 55 fathoms off the mouth of Kenmare River, but which had been overlooked when the material from the survey was handed to me last year.—GEO. H. CARPENTER.

INSECTS.

Winter Larvæ of *Vanessa atalanta*.—In the *Entomologist's Record* for January, we notice a record that living caterpillars of the "Red Admiral" were taken at Skibbereen on Jan. 11th. It would seem that the mild autumn of last year caused an abnormal second brood.

Hymenoptera in Co. Dublin.—The following Aculeate Hymenoptera were among my captures in this county last summer. Social Wasps—*Vespa germanica*, abundantly; *V. sylvestris*, sparingly; and *V. norvegica*, in some numbers. Solitary Wasps—*Odynerus pictus* and *O. parietum*, abundantly; *O. parietinus*, less commonly; and *O. spinipes* once, at Killiney. Bees—*Megachile centuncularis* frequently; and *Celioxys elongata*, once. The latter curious species, parasitic upon *Megachile*, was taken in my garden here, in company with its host. Two other bees of this class, parasitic on the *Andrenida*, occurred at Foxrock—*Nomada ruficornis* and *N. succincta*. Of *Andrena* itself I met with no noteworthy species, except *A. fucata* at Skerries, but *A. Guymana* was taken at Dundrum by my friend, Mr. Percy Freke.—H. G. CUTHBERT, Blackrock, Dublin.

MOLLUSCS.

Land-Shells at the Giant's Causeway.—Visitors to the Giant's Causeway will perhaps recollect a rather marshy bit of ground in Portnoffer, almost immediately below the "Shepherd's Path," which leads to the top of the cliffs. It is strewn with stones, large and small, and to a conchological eye suggests at once a happy hunting ground,—a suggestion, the correctness of which no collector should fail to test, if he has the chance. The dry summer of 1893 is hardly a fair season on which to base a comprehensive estimate of the district's land-shells, and I will only record a few interesting species that occurred in this spot at the Causeway. I might perhaps make an exception with regard to *Helix virgata*, as to the distribution of which in the north of Ireland I understand that special interest attaches. This species was plentiful by the side of the road leading down to the harbour at Ballintoy, but I saw it nowhere westward of that place, my researches extending to Port Ballintrae. *Helix ericetorum* and *Cochlicella acuta* were plentiful throughout. To return to Portnoffer—the best shell to be had there is certainly *Vertigo substriata*, and it is not uncommon, but a little villain to see. I found that the only plan was to lie amongst the reeds full length, and in respect at the closest possible quarters the rough surfaces of the boulders, turning down very carefully the grass and weeds round the edges. Some specimens of course were to be found on small, manageable stones, but the majority prefer the seclusion of the big, fixed blocks. *Vertigo anti-vertigo* was extremely scarce, *V. edentula* fairly common, but *V. pygmaea* occurred in profusion there as well as in other drier spots along the coast. It is easy however to recognize *substriata* from the rest by its paler yellow colour, and in fresh specimens the striae are distinctly plain to the naked eye. The colour of the animal seems to be very pale indeed. *Pupa ringens* was fairly common, and I got a nice series of *Helix rotundata* v. *alba*. Perhaps the most abundant shell of all there is *Clausilia rugosa*, and it was at once noticed that nearly all the shells were

a very small variety—smaller than anything I have seen outside the Channel Isles. This small variety figures on our lists as var. *Everetti* (has this priority of var. *minor*, Moq.?), and it is interesting to find that Jeffreys specially quotes the Giant's Causeway as a locality for this variety. *Carychium* of course was in evidence, and several *Hyalinia*, the most noteworthy being *H. radiatula*.—BROCKTON TOMLIN, Llandaff.

AMPHIBIANS.

Introduction of the Common Toad Into Ireland.—Some ten years ago about twenty live Toads were turned down here, but although, for a short time, one or two were to be found about the garden, it was only for a *very* short time, and none have now been met with for years. This note has been suggested by Dr. Scharff's assertion (in his paper on the Frog in Ireland) that "artificial introduction almost invariably fails." (*Irish Naturalist*, 1893, p. 3). Might I point out that the Caves of Ballynamintra are in the Co. Waterford, and not, as stated in Dr. Scharff's paper, in the Co. Wexford?—G. E. H. BARRETT-HAMILTON, New Ross.

BIRDS.

Our Autumn and Winter Migrants.—Rev. R. M. Miller sends us a popularly-written article on the above subject, which he recently (January 24th) contributed to the pages of the *Clonmel Chronicle*.

The Magpie (*Pica rustica*) in Ireland.—I have been much interested in Mr. W. F. De V. Kane's notes on the former scarcity of the Magpie in Ireland (*I. N.*, 1893, pp. 96 and 113), as they add slightly to the notes I have collected on the subject. Mr. Kane will find a paper on "The Introduction of the Magpie into Ireland" in the *Zoologist* (July, 1891, pp. 247-9).—G. E. H. BARRETT-HAMILTON, New Ross.

Jays (*Garrulus glandarius*).—As I am in want of a few Jays (both English and Irish) for purposes of comparison, might I ask readers of the *Irish Naturalist* who live in parts of the country where Jays are plentiful to kindly send me one or two specimens, the receipt of which will be at once acknowledged.—G. E. H. BARRETT-HAMILTON, Kilmanock, New Ross.

Green Sandpiper (*Totanus ochropus*) in Co. Tipperary.—On January 11th I received two birds for identification from Lough Derg. One was a Dunlin (*Tringa alpina*); the other an adult female Green Sandpiper, being the first I have seen in the flesh. Its stomach contained fresh-water snails and shells.—ROBERT PATTERSON, Belfast.

Little Auk (*Mergulus alle*) in Co. Sligo.—On the 27th December, 1893, I received a fresh specimen of the Little Auk. It was found alive inland about four miles from the sea, but died shortly after. Another specimen was shot on Lough Gill on the 29th of December, and came into the possession of Owen Wynne, Esq., Hazelwood, Sligo.—R. MCLEAN, Sligo.

MAMMALS.

The Rabbit on the Irish Isles.—In answer to Dr. Scharff's query (*Irish Nat.*, 1893, p. 277), I may state that the Rabbit is found both on the Saltee and Keragh Islands, off the Wexford coast. In a letter dated September 18, 1889, Mr. M. J. Kennedy, then light-keeper at Inishtrahull, Co. Donegal, stated that the Rabbit was "the only animal that thrives well" on that island.—G. E. H. BARRETT-HAMILTON, New Ross.

Badger (*Meles taxus*) in Co. Tyrone.—"J.A.B." records in *Land and Water* for January 13th the capture of a fine dog Badger, at Beltrim, Co. Tyrone, and remarks that this animal is very rare in the county, only four captures having been recorded in the last five years.

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IRISH BATS :

HOW TO COLLECT SPECIMENS WITH A VIEW TO THE
INVESTIGATION OF THEIR DISTRIBUTION.

BY H. LYSTER JAMESON.

LAST year I printed and circulated a few papers on the means to be adopted for collecting Irish Bats, and, as the season of the year in which they are most readily procurable is now approaching, I would like to call the attention of the readers of the *Irish Naturalist* to the wide field lying open for investigation, in the distribution in Ireland of our few species.

Our knowledge of the range and usual haunts of the seven species that are at present known to inhabit Ireland is as yet extremely limited, to say nothing of their habits. Few people, except those living in the centres of towns, pass a summer without opportunities for procuring specimens of the Bat tribe, and such specimens are almost impossible to identify without trustworthy books and a series of skins and spirit specimens for comparison ; as in many cases the specific characters are exceedingly minute. I therefore venture to put before the readers of the *Irish Naturalist* a short account of the most likely places in which to look for Bats. The Bats, or Cheiroptera, are nocturnal mammals, coming out from their sleeping-places at dusk to feed ; all our Irish species are insectivorous, living principally on flies, which they capture on the wing. In the day-time they lie hid in dark recesses of buildings, caves, &c., and it is in these places that they are most readily procured. The archæological remains of Ireland no doubt harbour numerous Bats, but they

are in many cases extremely difficult to explore with any results; specimens in such cases can best be obtained through farm servants, &c., who may know the part of the building in which to search for them. Workmen engaged in pulling down or repairing buildings frequently meet with colonies of Bats. Churches afford also admirable quarters, particularly in the towers and roofs. I have myself found the Long-eared Bat (*Plecotus auritus*) hanging in clusters from the rafters of a church. Bats in such a situation hang with their heads down and their wings folded to their body, a position which is portrayed in many works on natural history. The roofs and other parts of houses are also liable to be frequented. When Bats are known to inhabit such a place as a hole in a wall, tobacco smoke puffed in will generally succeed in bringing them out. Old sheds and farm buildings, summer-houses, boat-houses, &c., are excellent hunting-grounds.

In felling old trees, Bats may be found in holes and crevices and under the loose bark; hollow trees often are the homes of colonies. Projecting shelves, holes, and other such places in caves are inhabited by some species; they may be found hanging from the roof and bare walls. Very often buildings and isolated hollow trees near a lake or river repay a visit. When on the wing at night, Bats frequently fly in at open windows. I captured four specimens this way last summer and autumn in my room at Killencooles. When Bats are on the wing at dusk a well-aimed charge of No. 8 (snipe) shot will sometimes secure a specimen. Some species, such as the Hairy-armed Bat, come out long before dusk. The neighbourhood of water, particularly a canal, or the deep still pools of a river, should be visited at dusk with the gun.

We have seven species of Bats in Ireland, representing four genera. Our largest species is the Hairy-armed Bat (*Vesperugo Leisleri*). This species, in my experience, is an early flyer; the specimens which I saw at Loughgilly, Co. Armagh, used to appear some time before dusk. The flight is more "go-ahead" and hawk-like than that of its next neighbour the Pipistrelle. It has been found sparingly in the eastern counties as far south as Wicklow.

The Pipistrelle (*Vesperugo pipistrellus*) is the common Bat of the British Isles, and is probably pretty generally distributed; its flight is extremely erratic.

The three members of the genus *Vespertilio* are all rare in Ireland; the Whiskered Bat (*Vespertilio mystacinus*) and the Reddish-grey Bat (*V. Nattereri*) inhabit houses, trees, and caves in England. Daubenton's Bat (*V. Daubentonii*) is also rare; it frequents the vicinity of water, and is likely to be found in old water-mills and bridges. This species skims along over the surface of the water, like a swallow, in pursuit of small insects.

The Long-eared Bat (*Plecotus auritus*) is common, and inhabits the roofs of houses and other buildings.

The last species, the Lesser Horse-shoe Bat (*Rhinolophus hipposideros*) is a cave dweller; it is rare and local in Ireland; the limestone caves of the West should be well explored for this species.

Specimens when procured, if alive, should be sent by rail, labelled perishable; if dead they can be sent by parcel post, but it is preferable to send by rail. The locality, situation, date, and name and address of sender should accompany each consignment of specimens. It is much better in most cases to put the specimens as they are captured into spirits, than to send single specimens by post in small packages; the tubes or bottles containing the spirit specimens can be sent then in a larger parcel by rail, or they can be taken out of spirits and sent safely in a tin box. The full data should be attached to each specimen when put in spirits, otherwise confusion may arise. If senders desire, I will present specimens forwarded to me for identification to the Science and Art Museum, Dublin, in sender's name.

It cannot be made too plain that it is impossible to identify Bats (except one or two species), without books and specimens for comparison; to senders who wish to make a collection, I will gladly return specimens when identified. I will willingly furnish any further particulars as to collecting and preserving to those who communicate with me. Tubes for spirit specimens can be had from Mr. Marsden, Bath.

There exists a strange idea that bats are noxious animals. It is needless to say that our Irish species are perfectly harmless; not one of them can inflict a bite sufficient to pierce the skin.

Killencoole, Castlebellingham.

POSSIBLE ARCTIC PLANT-BEDS IN IRELAND.

BY JAMES BENNIE,

Her Majesty's Geological Survey of Scotland.

It has been suggested to me that a summary of what I have got from Arctic Plant-beds in Scotland, and a description of where and how they occur, might be of advantage to students of nature in Ireland, as to where and how the same things might be got in that country.

WHAT HAS BEEN GOT :—Chiefly arctic plants of six or seven species, the most abundant being leaves of the arctic Willows—*Salix herbacea*, *S. reticulata*, *S. polaris*, *Oxyria digynia*, *Betula nana*, and *Dryas octopetala*, and associated with them, the remains of *Apus glacialis*, a crustacean now only known living in the land-lakes of Spitzbergen and Greenland. Of the arctic Willows the one in greatest abundance was *Salix herbacea*, which was in thousands upon thousands. *S. reticulata* came next, then *S. polaris*. *Betula nana*, though not rare, was comparatively infrequent, while *Dryas octopetala* was excessively rare, only about half a dozen leaves being got altogether. The *Apus* remains were comparatively abundant, indicating hundreds of individuals. Besides leaves, seed-cases were abundant. A few leaves of other plants occurred, and seeds of the ordinary water-plants—the pondweeds and the sedges were very numerous.

WHERE THEY OCCURRED :—In the bottom of old silted-up lakes, and generally in thin layers in silt or clay ; sometimes amongst other vegetable debris, and occasionally as single leaves in the silt. These old lake-deposits lie directly or nearly so upon Boulder clay, in the flat spaces or hollows between hillocks or mounds of that glacial drift ; and thereby we get evidence of the date of their existence. It must have been soon after the ice melted from off the land, and water became possible as water, to form pools in the hollows, and plants could grow on the hills or hillocks surrounding them. This date is confirmed by the characters of the Arctic plants, which are such as prove a climate 20 degrees colder than what prevails in the same places at present ; and also by the occurrence of the *Apus*, which is now found living only in Greenland and Spitzbergen.

The places where these lake-deposits with the Arctic plants and the *Apus* were got are Hailes Quarry, about three miles west of Edinburgh, and in a sewer-cutting through the old silted-up lake of Corstorphine, about four miles west of Edinburgh, the first being 150, and the latter 50 feet above sea-level. The deposits cut through at Hailes were 10 or 12 feet of sands and grits, with occasionally patches of peat, layers of vegetable drift-wrack, with pieces of drift-wood. At Corstorphine, 4 or 5 feet of sands, then marl with the ordinary lake-shells—*Cyclas* and *Planorbis* being the most common; and the ordinary water-plant stems in such numbers that the marl was felted by them. At the bottom of each was the silt with the arctic plants, with the *Apus* remains interspersed in fragments.

Such is a bald statement of what was got in these old lake-deposits, but enough, it is hoped, to show that they are worthy of investigation wherever found, as by them we may know something of a land of which we know little—the land of the later times of the Glacial period; a land on whose hills the only trees that grew were the creeping willows, and in whose waters the liveliest creatures were the crawling *Apus glacialis*.

A description of the methods by which these results were obtained will fitly close this notice.

If the plant-remains occur as layers in silt or clay, the matrix should be dried thoroughly, then crushed gently with the hand in a basin of water, when the silt will part readily from the leaves or debris—some of the leaves and seeds and mosses will float, but others will sink. When the silt is thoroughly melted or divided, allow the water to settle; then pour it off into a sieve, and then as many of the leaves, &c., as floated will be got with as little breakage as possible. The remainder should also be sieved in the same way. Sieves of different meshes are useful, say from $\frac{1}{4}$ of an inch in width, to a fineness of 90 in a lineal inch. Sieves about 6 inches square and 1 inch in depth, made of tin, with a wire round the top, and the bottom turned inwards $\frac{1}{4}$ of an inch, to which the brass wire cloth should be closely soldered, will be found convenient.

If the leaves should be in peat, then the peat should not be dried, but taken soft as lifted, and crushed or bruised in water

in the same manner as the silt. The reason is that many peats grow so hard when dried, that they will not divide or melt at all ; some, however, will crush if boiled for a time.

By means such as these the results described have been obtained without much trouble ; and their application to the lake-silts or peats of Ireland should produce the same results.

AN ACCOUNT OF MEDIEVAL IRELAND, BY
BARTHOLOMEW ANGLICUS (13TH CENTURY).

BY V. BALL, C.B., LL.D., F.R.S.

In the course of my researches among ancient authors regarding the productions and myths of India, I have from time to time met with accounts of various matters referring to Ireland, and it has occurred to me that the following extract, with explanatory notes, as a first contribution of this nature, may prove of interest to the readers of the *Irish Naturalist*.

The work of Bartholomew Anglicus, of which an epitome has recently been published by Mr. Robert Steele¹, was one of the most widely read books of medieval times. The author, an English Franciscan, produced this encyclopædia about the year 1260, in order to explain many then current allusions to natural objects, &c. Its popularity continued after the invention of printing, and numerous editions in various languages appeared in the 15th century.

OF HIBERNIA, CAP. LXXX.

“ Yrlonde hight Hibernia, and is an island of the ocean in Europe, and is nigh to the land of Britain, and is more narrow and straight than Britain, but it is more plenteous place In this land is much plenty of corn-fields, of wells and of rivers, of fair meads and woods, of metal and of precious stones. For there is gendered a six cornered stone that is to wit, Iris, that maketh a rainbow in the air, if it be set in the sun (1) and there is jet found. (2). and white pearls. (3). And concerning the wholesome air, Ireland is a good temperate country. There is little or

(¹) Medieval Lore, An Epitome of the Science, &c., &c., of the Middle Age, being gleanings from, &c., &c., of Bartholomew Anglicus (*De Proprietatibus rerum*), Edited by Robert Steele: London, Elliot Stock, 1893, pp. 79-81.

none passing heat or cold, there be wonderful lakes, ponds, and wells. For there is a lake, in which if a staff or a pole of a tree be pight, and tarrieth long time therein, the part that is in the earth turneth into iron, and the part that is in the water turneth into stone, and the part that is above the water abideth still in its kind of tree. There is another lake in which if that thou throwest rods of hazel, it turneth those rods into ash : and ayenward if ye cast ashen rods therein, they turn into hazel. (4). Therein be places in which dead carrions never rot, but abide there always uncorrupt. Also in Ireland is a little island, in which men die not, but when they be overcome with age, they be borne out of that island to die without (5.) In Ireland is no serpent, no frogs, nor venomous addercrop, but all the land is so contrary to venomous beasts, that if the earth of that land be brought into another land, and spronge on the ground, it slayeth serpents and toads. Also venomous beasts flee Irish wool, skins and fells. And if serpents or toads be brought into Ireland by shipping, they die anon. (6).

“Solinus speaketh of Ireland, and saith the inhabitants thereof be fierce and lead an unhuman life. The people there use to harbour no guests, they be warriors, and drink men’s blood that they slay, and wash first their faces therewith ; right and unright they take for one . . . Men of Ireland be singularly clothed and unseemly arrayed and scarcely fed they be cruel of heart, fierce of cheer, angry of speech, and sharp. Nathless they be free-hearted, and fair of speech, and goodly to their own nation, and namely those men that dwell in woods, marshes, and mountains. These men be pleased with flesh, apples, and fruit for meat, and with milk for drink ; and give them more to plays and to hunting, than to work and travail. (.7).”

(1) The term *Iris* was applied by Pliny to hexangular crystals of quartz, which, when placed in the sun, were capable of forming the prismatic spectrum on a wall. Another variety, esteemed by the ancients, owed its colours to the existence of internal fractures with which the phenomenon of Newton’s rings was manifested.

(2) Jet may occur in other places in Ireland, but is certainly obtained from the Coal-measures of Ballycastle, Co. Antrim, its characters being apparently due to the influence of basaltic dykes on the coal seams which occur there. There is a sample of an early polished specimen from this locality in the Dublin Museum, and I have heard, locally, of ornaments having been formerly carved from this material.

(3) As is well known, pearls are produced in a species of freshwater mussel (*Unio*) in the rivers of Fermanagh, Tyrone, and Donegal. There are records of pearls of considerable value having been found in these rivers.

(4) The lake referred to is obviously Lough Neagh, on the shores of which partially silicified wood of Eocene age is found. This subject has recently been discussed by Mr. Wm. Swanston (*Irish Nat*, vol. ii., (1893) pp. 63 and 104). As is so often the case with myths, this one has derived new features with repetition. Bartholomew has, apparently, improved upon his predecessors.

(5) These statements are from Giraldus Cambrensis' *Topographia Hibernia*, and I am indebted to the Rev. D. Murphy, S.J., for the following rendering of the original passages :—

Cap. VI.—“There is an island situated on the western part of Connaught, named Aran, which St. Brendan blessed. Dead bodies are not buried there, nor do they grow corrupt; but placed in the open air, they remain incorruptible.”

Cap. IV.—“There is a lake in North Munster, containing two islands, one larger and a smaller. The larger has a church of an old religious order; the smaller, a chapel which Culdees serve. In the smaller no one ever died or could die a natural death; hence it is called the island of the living. Sometimes the inhabitants are afflicted by mortal diseases, and much affected, even to the drawing of the last breath. And when there is no longer any hope, or vital power remaining, and they are so worn out by the strength of the illness that they had rather die than live, they have themselves taken in a boat to the larger island; and as soon as they touch land, they give up the ghost.”

N.B.—The name of the island is Inis-na-mbeo, *i.e.*, island of the living; now Mona-hincha, *i.e.*, bog of the island. It is no longer an island, the waters that surrounded it having been drained off. It is about two miles S.E. of Roscrea, Co. Tipperary. There are remains of a very beautiful Irish church of the 8th or 9th century on the island.—D.M.

(6) These remarks about serpents and venomous beasts appear likewise to be derived from Giraldus, whose observations at large on such subjects are, perhaps, deserving of more special and direct criticism and investigation than they have hitherto received.

(7) I make no comment on this account of our ancestors and predecessors, though it affords a subject for reflection which would, however, scarcely be legitimate for treatment in this Journal.

THE PLANTS OF WESTMEATH.

BY H. C. LEVINGE, D.L.

THE following list of plants, from which all the commoner species have been excluded, fairly represents, I believe, the Flora of the central part of the Co. Westmeath in the neighbourhood of the larger lakes, Ennel, Derevaragh, and Owel; but though I think it unlikely the lists will ever be very largely added to, it can hardly be called a *complete* enumeration of the rarer plants of the county, as I regret I have not had many opportunities of examining the remaining portion of the county, but I believe the parts most likely to prove botanically interesting have been thoroughly explored. I have availed myself of the kind permission given to me by Mr. Barrington to quote largely from the interesting paper by himself and Mr. Vowell on the "Flora of the Shores of Lough Ree," and have included, in my list, the names of all the rarer plants which they observed in their explorations of that part of the country inside the boundaries of Westmeath. It must, however, be remembered that in their abstract of names of plants, new to district 7 of the "Cybele Hibernica," they have included those which occur in the Co. Longford as well as those of Westmeath. Mr. Barrington was kind enough to indicate, for my use, most of the Westmeath species; but there still remain a few, noted as common or frequent round the lake, regarding which some uncertainty exists, and in each doubtful case I have made a separate note. The rock in the tract immediately under notice is the Upper Carboniferous Limestone, and the three lakes above mentioned form the prominent feature of the country. Of these L. Ennel, supplied by the River Brosna—274 feet above the sea-level, and with an area of 3,603 acres—is the largest; next comes L. Derevaragh—sometimes called Donore Lake—210 feet above the sea, and having an area of 3,051 acres. At its S.E. end rise three considerable hills, Knock Body, Knock Ross, and Knock Eyon, the top of the last named being 707 feet above the sea. The River Inny, which flows through a series of large bogs from L. Sheelin, enters and leaves the lake at its N.W. end. Lastly L. Owel, 329 feet above the sea, and 2,527 acres in extent, forms the summit-level supply to the Royal Canal, which extends eastwards to Dublin and westwards to the

Shannon. The water of this lake is exceptionally clear and brilliant, and of a pale emerald-green colour in the shallows ; but, being supplied almost altogether from springs, it is exceedingly hard, and the plants growing in it are consequently much encrusted. With these few preliminary remarks I now proceed to mention some of the most interesting plants found in and near these lakes, and in other selected localities. On the shores of L. Ennel, *Stellaria glauca*, *Cicuta virosa*, *Carex paradoxa*, and *Carex Ederi* were observed ; and it was in this lake that *Chara tomentosa* was first discovered ; it is, however, here somewhat dwarfed, and, as far as I have seen, does not appear to grow to anything like the same size as in the other lakes. In L. Derevaragh I was fortunate enough to find *Ceratophyllum demersum*, rather a scarce plant in Ireland, but abounding in that part of this lake known as the "Pond of Donore." Here also, plentifully distributed, grows the beautiful *Chara tomentosa*, with its pink, coral-like, branched heads, and in this part of the lake, as well as in the boat harbour of Kiltoom, *Tolypella glomerata* was found in abundance. Near the Coolure shore, at the mouth of the Yellow River, *Callitriche hamulata* and *C. obtusangula* were observed by Messrs. J. and H. Groves. L. Owel produces some uncommon plants, *Potamogeton prælongus*, *P. Zizii*, *P. lucens*, and *P. heterophyllus*, as well as a species, growing near Mount Murray, not fruiting or coming to the surface, which the Messrs. Groves were unable to determine ; it resembles *P. nitens* in foliage and general character. In this lake are also *Ranunculus pseudo-fluitans*, *R. trichophyllus*, *Myriophyllum verticillatum*, *M. spicatum*, and *Chara tomentosa*, the latter growing in a bay, or rather an inner lake at Tullaghan, even finer and larger than in Lough Derevaragh. A variety of *C. tomentosa* was also discovered in a drain connected with the lake by the Messrs. Groves, who have not yet, I believe, given it a name. At the N.W. end, in the marshy, and at times submerged land near the village of Bunbrusna, *Lathyrus palustris* grows luxuriantly and plentifully along with *Scutellaria galericulata*, *Rumex Hydrolapathum*, and *Cnicus Forsteri*, and at the S.E. end of the lake, near the canal supply at Levington, *Juncus obtusiflorus* occurs. But nowhere in the county have so many rare plants been observed as in the 'Scraw bog' of Loughanstown and Ballynegall, situate about half a mile to

the east of L. Owel. This flow bog, which is three-quarters of a mile long, and about one furlong wide, owes its name to the 'scraw' or mat of vegetation which, as it were, floats on the water and mud beneath—and as there are many holes it is essentially a dangerous place, especially after heavy rains, when it is more or less submerged. The 'scraw' is formed mostly of *Carex teretiuscula* and *C. filiformis*, both rather uncommon elsewhere; other sedges are *C. dioica*, *C. pulicaris*, *C. limosa*, &c. *Vaccinium Oxycoccus* here forms large beds from which quantities of cranberries—or, as they are termed in Ireland, bogberries—are gathered, while some of the drains are at the proper time white with the delicate flowers of *Hydrocharis Morsus-ranæ*; but the most beautiful plant here is *Pyrola rotundifolia*, which grows in luxuriant profusion, generally through tufts of willows; *Juncus obtusiflorus* is also abundant, and my friend Mr. A. G. More will have to modify the remarks in "Cybele Hibernica" that the few Irish localities known are "on or near the sea coast." In one of the small holes in this bog Mr. H. Groves discovered, for the first time in Ireland, that beautifully delicate little plant *Nitella tenuissima*. I have searched diligently, but in vain, for this in other places; it has however been since found by Mr. Groves in a bog in the County Galway. In some of the holes *Potamogeton plantaginifolius* occurs, and a fine form of *Chara polyacantha*, also *Chara fragilis* var. *barbata*. In the list, frequent mention is made of Knock Ross; this hill, with its steep rocky slopes covered with brushwood, which I believe to be indigenous on its southern side at least, forms a promontory in the S.E. end of L. Derevaragh. Here occurs *Cornus sanguinea*, identical with the Clare plant; there seem to be some doubts whether it is truly indigenous in this locality; but if it be not so, it is at any rate thoroughly established and very plentiful. In the wood, near the shore of the lake, I observed two rather uncommon grasses, *Milium effusum* and *Festuca sylvatica*, also at the water's edge on the northern side *Crepis paludosa*, and two forms of *Festuca elatior*, var. *lohiacea*, Huds., regarding which some remarks will be found in the list. In the Knock Ross woods I gathered most of the *Rubi* which are included in the list below; these have all been examined and named by the Rev. E. F. Linton. I have no doubt that many more species exist in this as well as in other localities in the county, and I

much regret that, owing to my imperfect knowledge of this difficult genus, I am unable to distinguish the several species and varieties as now arranged by experts. In the bog of Lis-clogher, situated quite at the eastern side of the county, near the borders of Meath, and in the exploration of which I had the great advantage of Miss E. Reynell's assistance, the following plants occur:—*Saxifraga Hirculus* and *Pyrola rotundifolia*, both sparingly; *Empetrum nigrum*, *Viola palustris*, *Carex dioica*, *C. limosa*, *Drosera anglica*, and *Lastrea Thelypteris*.

The total number of species hitherto observed in the county is 560; and when it is considered that the list of *Rubi* is still incomplete, and that maritime plants are of necessity not represented, it will I believe be found that this number bears favourable comparison with that of other counties. In this list, 66 additions have been made to district 7 of the "Cybele Hibernica," inclusive of 15 *Rubi*.

In compiling the list it was my wish and intention to include the names of the rarer plants only; but as some of the more common ones had not been recorded in the "Cybele Hibernica" as from district 7, I have been obliged to notice them, otherwise they might very well have been left out.

To Mr. A. G. More my best thanks are due for the kind assistance he has always given me in determining doubtful species, and for his advice in arranging the materials for this paper; also to Messrs. Barrington and Vowell for permitting me to make use of their pamphlet on the "Flora of the Shores of L. Ree"; to Mr. E. F. Linton for examining and naming the *Rubi*; and to the Messrs. Groves, who identified the Characeæ and other aquatic plants.

In the list, the letters B. and V. represent Messrs. Barrington and Vowell; F. J. F. represents Mr. Foot; and D. M., Dr. David Moore.

The mark † indicates plants which I have myself observed; but it has only been used in cases where others have also collected the species. The number "VII." occurring after the name of any plant signifies that it had not previously been recorded from that district as defined in the "Cybele Hibernica." The marks *, †, and ‡ signify respectively that the species so indicated have been certainly, probably, or possibly introduced.

(TO BE CONTINUED.)

ON A RECENT FIND OF IRISH ELK BONES, &c., IN BELFAST,

BY R. M. YOUNG, B.A., M.R.I.A.

(Read before the Belfast Natural History and Philosophical Society,
6th March, 1894.)

IN connection with the great system of main drainage which is now approaching completion in Belfast, excavations for an intercepting sewer were made in January of this year under the footpaths on the east side of High Street and Castle Place. A quantity of human bones were dug up opposite St. George's Church, where the burying ground of the previous Church of St. Patrick had extended, but it was not till the workmen reached Castle Place that anything of special interest was found. On the 18th January an intelligent workman brought me three jaw-bones which had been taken from a depth of seven feet under the footpath at Mr. Watson's shop, No. 10, Castle Place. Prof. R. O. Cunningham, M.D., kindly examined these bones, and pronounced them to be those of an Irish Elk, Horse and Sheep. Opposite Messrs. Hart & Churchill's shop quite a number of jaws of the Irish Elk were turned up, with some fragments of leg and rib bones; these were associated with branches of trees, probably Willow, and were 6 feet 10 inches under the surface of the footpath flags. No other bones appeared till the excavation reached Bank Lane, where Mr. S. F. Milligan, M.R.I.A., secured some bones, apparently of the horse and dog, which he has kindly presented to the Museum.

As the fine specimen of the Great Irish Deer (*Cervus giganteus*) in the Belfast Museum is well known, I may merely mention that this splendid animal surpassed in size the largest living deer (*Cervus canadensis*). Its antlers were sometimes more than eleven feet from tip to tip, whilst those of the Moose are only four feet. The most recent local discovery of Irish Elk bones seems to be that described by Mr. R. Ll. Praeger on 16th February, 1892, when he exhibited at a Field Club meeting a skull found in the preceding December in excavating near the Spencer Basin. It was in the centre of a peat bed, three feet thick, with a depth of thirty feet of estuarine clay above. In the same bed of peat at the Alexandra Dock, bones of the Red Deer and Wild Boar are recorded by Mr. Praeger. This present find of Irish Elk bones seems

the first to be noted within the municipal boundary of the city. In 1860, when the sewer through which the Farset, or High Street river, flows was re-built in Castle Place, a large number of antiquities were dug up, but amongst them the only bones were a human skeleton and a boar's tusk.

There are some features of special interest to be noted with regard to this latest discovery of animal remains. They were lying almost on the surface of the estuarine clay or "sleech," and the Irish Elk, horse, and sheep bones were found close together as if either swept down by some flood or possibly deposited in situ by human agency. This latter supposition is strengthened by the remarkable appearance of some of the larger bones, which apparently have been broken into short lengths to extract the marrow. They resemble in this respect the bones so treated by the cave-men and the Swiss lake-dwellers. Prof. Cunningham has kindly promised to look carefully over these bones again, as he could only give them a hasty examination.

It is of importance to note that in 1868 a deposit of similar geological age was met with at the Clowney River, where the Broadway Factory now stands; and amongst the bones of the Red Deer dug up two were found with artificial markings where flint tools had been at work.

Another recently discovered relic of the past may be mentioned as occurring in the same stratum of the estuarine deposits about half a mile distant from Castle Place. I refer to the supposed canoe which was cut through in driving sheet piles at the Council waste ground near Albert Bridge, where Messrs. Workman & Co. have a section of the main sewer in construction. On visiting the place last December with Mr. L. M. Ewart, J.P., M.R.I.A., we saw at a depth of ten feet the trunk of an oak tree, four feet in diameter, which was excavated or burnt out on the upper side like a canoe. A piece was cut out of the centre by the piles, and measured $6\frac{1}{2}$ feet long by 4 feet wide and 3 feet deep. The thickness of the side was not more than 6 inches, and the wood was sound in the middle. The two extremities of the tree were then undisturbed in the "sleech," but I understand that one end has now been laid bare, and it forks off into two branches. As the other end is still covered it might show visible signs of a canoe in process of manufacture, if exposed.

INSECTS COLLECTED BY THE ROYAL IRISH ACADEMY FLORA AND FAUNA COMMITTEE,

1893.

BY REV. W. F. JOHNSON, M.A., F.E.S., J. N. HALBERT, AND
GEORGE H. CARPENTER, B.SC.

THE Committee appointed by the Royal Irish Academy to report upon the Irish Flora and Fauna directed insect collections to be made by us in four localities during 1893. We have now pleasure in making public the result of our work, which has been fruitful in adding many new species to our known fauna, and extending our knowledge of the range of many more. Yet, it is certain that much more remains to be done before our knowledge of any group of insects—even the best-worked—can be said to have approached completion. We therefore make no apology for giving complete lists of the insects collected, the range of the commonest species being worth knowing exactly; and we trust that our present contribution may supplement the classic researches of the pioneers of Irish entomology—Haliday, Hogan, and Birchall—in affording material for the perfect lists of the future, which we all hope to see.

A short description of the localities worked is desirable. Mr. Johnson collected at Coolmore, Co. Donegal, in July; Mr. Carpenter worked along the southern shores of Bantry Bay at the end of May and early days of June, and at Killarney at the end of November; Mr. Halbert explored the Dundalk district in July (on the occasion of the joint excursion of the Dublin and Belfast Field Clubs), and the Cavan district early in October. Regions in the north-west, south-west, north-east, and northern midlands of Ireland have thus been worked.

The north-western station, Coolmore, is situated on the southern side of Donegal Bay, about $4\frac{1}{2}$ miles north-west of Ballyshannon. Northwards the coast is sandy, with extensive dunes, but southwards, towards the mouth of the River Erne, it is rocky. Inland, the surface is hilly with a few trees in the sheltered valleys. One day was spent on the River Erne above Ballyshannon, and another at Brown Hall, Ballintra; both were very promising localities, but unfortunately it was impossible to spend more than a few hours at each. At Coolmore

the sandy beach, dunes, and some marshy ground beyond them were most productive. Some good things were also got at Kilbrannan Castle on the cliff, and at Coolbeg on thistles, &c., and under the bark of dead trees.

In the south-western district Killarney is well enough known, and the insects obtained were but few and common ; some rare spiders, however, rewarded the collector, but their records are reserved for a general list of Irish spiders now in course of preparation. At Bantry Bay, Castletown-Berehaven was the head-quarters, and in its neighbourhood the wild cliffs and the beautifully wooded demesne of Dunboy afforded excellent collecting-ground. Dr. M'Weeney and Mr. M'Ardle, when botanizing on Bere Island, were so good as to pick up what insects they saw. Dr. Scharff made some interesting discoveries during an ascent of the precipitous Hungry Hill, which rises to the east of Castletown to a height of over 2,000 feet ; its slopes, now bare and rugged, are said to have nursed a rich growth of *Arbutus* in former days. Would that a collector had visited it then ! To the north of Castletown is the lower range of the Slieve Mishkish, with wide-stretching tracts of bog. A day was spent on Dursey—the island to the extreme west of the peninsula. From Adrigole, a village to the east of Castletown, an excursion was made, first over large tracts of bog, and then by a rugged pass behind the Sugarloaf Mountain to Glengarriff. A few insects were obtained in the woods at the latter place.

In the north-eastern district collections were made near Dundalk, on Slieve Gullion (1,893 ft.) and Fathom Hill, Co. Armagh, along the beach at Carlingford and Greenore, and in the grounds of Narrow Water, Co. Down.

In the neighbourhood of Cavan, the collecting extended from the 7th to the 11th of October ; many of the localities worked proved very productive, the best probably being Lough Oughter shore, one of a chain of lakes occupying a considerable portion of the centre of the county, and lying to the west of the town ; on its margin are remnants of very old woods, as well as Birch and Fir plantations ; the lake itself looked barren and unproductive, partly due to the lateness of the season, the vegetation being practically over, but from the drains, and especially along the shore many interesting species were taken. The country about the town is of a very

undulating character, the principal elevation being Slieve Glah (1,057 feet), which was carefully searched for the mountain species, and the woods near Cultragh Lough, a large sheet of water to the north of Slieve Glah, also yielded good results. One day was spent at Ballyhaise, about four miles from Cavan, the extensive plantation on the south bank of the river Anna-lee, known as Oak Wood, being very productive. Those species in the list localized "Cavan" were obtained by sweeping, examining bark, moss, &c., in the narrow strips of planted wood bordering the roads, in many places, in the vicinity of the town; a short time was also spent in the Farnham demesne. Altogether, there are many promising localities, especially the lake shores, which would undoubtedly repay a more thorough investigation.

HEMIPTERA HETEROPTERA

In enumerating the insects of this group, we think it advisable to give, in addition to the localities mentioned above, any others in Ireland from which we know them to have been recorded or captured. So little is known of the distribution of these insects in Ireland¹ that it is advisable to give the range as fully as possible. An asterisk is prefixed to the species (four in number) which we believe to be new to the country. We have to thank Mr. E. Saunders, F.L.S., for identifying some of the species.

PENTATOMIDÆ.

Carpocoris baccarum, L.—Durseley. This local species has occurred also in the south-west near Dingle. Mr. J. M. Browne has taken it on Gt. Aran Island, Galway Bay, and also on Inishbofin, off Co. Mayo; Dr. Power near Waterford, Mr. H. G. Cuthbert at Courtown, Co. Wexford, and Mr. W. F. de V. Kane at Howth. In England it seems confined to the south, and is specially characteristic of the south-western counties.

Tropicoris rufipes, L.—Berehaven. Also occurs at Armagh (W.F.J.), Dublin (J.N.H.)

COREIDÆ.

***Syromastes marginatus**, L.—Berehaven. This insect is new to Ireland, and is also, we believe, the first example of its sub-family (*Coreince*) ever taken in the country. In Great Britain it seems confined to the south of England and South Wales, a distribution characteristic of the British insects of the family, not one of which, according to Mr. E. Saunders, has been found in Scotland. Mr. Haliday took *Corizus parumpunctatus*, Schill. (sub-fam. *Corizina*) in Ireland.²

¹ See E. Saunders,—The Hemiptera-Heteroptera of the British Isles, London, 1893. W. F. Johnson,—Hemiptera in the North of Ireland, *Ent. Mo. Mag.*, xxix., 1893, p. 35. Dr. Power,—*Entomologist*, xv., 1878.

² In Thompson's Nat. Hist. Ireland, vol. iv., p. 367, Haliday gives four as the number of species of *Coreidæ* in Ireland. From his MS. list (kindly lent us by Dr. E. P. Wright) it appears, however, that three of these are *Berytida*,

LYGÆIDÆ.

Nysius thymi, Wolff—Coolmore. Has also occurred at Bundoran (W.F.J.), and Dr. Power has taken it near Dublin.

Stygnus pedestris, Fall. — Coolmore. Ballyhaise. Armagh (W.F.J.), Dublin (J.N.H.)

S. arenarius, Hahn—Berehaven. Armagh (W.F.J.). Near Waterford (Dr. Power).

Drymus brunneus, Sahlb.—Killarney. Also at Powerscourt (Dr. R. F. Scharff).

Scolopostethus decoratus, Hahn—Slieve Glah, commonly on heath. Has also been recorded from Carlingford and Co. Armagh (W.F.J.)

TINGIDIDÆ.

Dictyonota crassicornis, Fall.—Coolmore. Taken by Mr. Haldy in Co. Dublin.

Monanthia cardui, L.—Coolmore. Also recorded from Armagh (W.F.J.); locally common in Co. Dublin (J.N.H.)

HYDROMETRIDÆ.

Hydrometra stagnorum, L.—Berehaven; Dursey. Also recorded from Armagh (W.F.J.); common in Co. Dublin (J.N.H.)

Vella currens, Fab.—Coolmore. Dundalk. Berehaven, common; Dursey. Common in Co. Armagh (W.F.J.) and Co. Dublin (J.N.H.), and doubtless generally distributed.

Gerris costæ, H.-S.—Slieve Gullion, in a small pool near the summit. This northern and alpine species has also occurred at Newtown Hamilton, Co. Armagh, and Ardara, Co. Donegal (W.F.J.)

G. thoracica, Schum.—Coolmore. Also at Tallaght, Co. Dublin (J.N.H.)

G. lacustris, L.—Coolmore. Berehaven; Dursey. Also recorded from Armagh (W.F.J.), common in Co. Dublin (J.N.H.)

REDUVIIDÆ.

Nabis flavomarginatus, Scholtz—Dundalk; Carlingford. Also recorded from Armagh (W.F.J.), and Dublin (J.N.H.)

N. ilimbatus, Dahlb.—Dundalk, common. Also recorded from Co. Armagh (W.F.J.), Co. Dublin (J.N.H.)

SALDIDÆ.

Salda orthochila, Fieb.—Slieve Gullion, in moss near summit. Also recorded from Armagh (W.F.J.) and Dublin (J.N.H.)

CIMICIDÆ.

Anthocoris nemoralis, Fab.—Dundalk. Also taken at Ardara and Armagh (W.F.J.), and in Co. Dublin (J.N.H.)

A. sylvestris, L.—Dundalk. Cultragh Lough. Recorded from Armagh and Ardara (W.F.J.), common in Co. Dublin (J.N.H.)

CAPSIDÆ.

***Pithanus Maerkell**, H.-S.—Dundalk. This insect, widely distributed in Great Britain, has not been recorded for Ireland before. Taken also in Co. Dublin (J.N.H.)

Miris calcaratus, Fall.—Dursey. Recorded from Armagh (W.F.J.) has also occurred in Co. Dublin (J.N.H.)

M. holisatus, Fab.—Coolmore. Recorded from Armagh (W.F.J.) common in Co. Dublin (J.N.H.)

Leptopterna ferrugata, Fall.—Fathom. Recorded from Armagh, Ardara, and Beleek (W.F.J.) and at Portmarnock (J.N.H.)

Monalocoris filicis, L.—Narrow-water. Cultragh Lough. Recorded from Bundoran (W.F.J.), Co. Dublin (J.N.H.)

Calocoris bipunctatus, Fab.—Coolmore. Dundalk, common. Recorded from Armagh, Bundoran, Ardara, and Beleek (W.F.J.), common in Co. Dublin (J.N.H.)

C. roseomaculatus, DeG.—Carlingford. Recorded from Armagh (W.F.J.)

Lygus pratensis, Fab.—Carlingford. Recorded from Armagh (W.F.J.), common in Co. Dublin (J.N.H.)

var. **campestris**, Fab.—Dundalk. Recorded from Ardara (W.F.J.), common in Co. Dublin (J.N.H.)

***L. viridis**, Fall.—Fathom. This species also taken in Co. Dublin (J.N.H.) is distributed over the south of England, seems not to have been previously recorded from Ireland.

***L. lucorum**, Mey.—Dundalk. New to Ireland. Also taken in Co. Dublin (J.N.H.); recorded from England, Wales, and Scotland.

L. pabullinus, L.—Dundalk. Recorded from Armagh and Ardara (W.F.J.) Common near Dublin (J.N.H.)

L. cervinus, H.S.—Dundalk. Recorded from Co. Armagh (W.F.J.) Common in Co. Dublin (J.N.H.)

Rhopalotomus ater, L.—Coolmore. Dundalk. Recorded from Armagh and Beleek (W.F.J.) Common in Co. Dublin (J.N.H.)

Campyloneura virgula, H.S.—Narrow-water. Recorded from Co. Armagh (W.F.J.) Taken in Co. Dublin (J.N.H.)

Mecomma ambulans, Fall.—Carlingford; Fathom, common. Recorded from Armagh (W.F.J.) Common near Dublin (J.N.H.)

Plaglognathus arbustorum, Fab.—Coolmore. Dundalk, common. Recorded from Armagh, Bundoran, and Ardara (W.F.J.) Common in Co. Dublin (J.N.H.)

P. viridulus, Fall.—Coolmore. Carlingford, common. Recorded from Armagh and Greenore (W.F.J.) Common in Co. Dublin (J.N.H.)

NEPIDÆ.

Nepa clnerea, L.—Coolmore. Lough Oughter, under stones at some distance from the water's edge. Recorded from Armagh (W.F.J.) Common near Dublin (J.N.H.)

NOTONECTIDÆ.

Notonecta glauca, L.—Coolmore. Slieve Gullion, lake at summit. Lough Oughter. Doubtless generally distributed, as it has also been taken at Armagh (W.F.J.) and Dublin (J.N.H.)

var. **maculata**, Fab.—Lough Oughter. Clonmacate (W.F.J.)

CORIXIDÆ.

Corixa Geoffroyi, Leach.—Coolmore. Recorded from Armagh and Ardara (W.F.J.)

C. atomaria, Illig.—Coolmore. Also recorded from Holywood, Co. Down (W.F.J.)

C. striata, Fieb.—Coolmore. Recorded from Armagh and Holywood (W.F.J.)

C. Fabricii, Fieb.—Coolmore. Recorded from Armagh, Holywood, and Ardara (W.F.J.)

Sigara minutissima, L.—Coolmore. Only hitherto known as Irish from specimens in the collection of the late A. H. Haliday.

HEMIPTERA HOMOPTERA.

This group has been even less worked in Ireland than the Heteroptera, we therefore give all the localities known to us for the species taken. An asterisk is prefixed to those for which we can find no previous Irish record. Our best thanks are due to Mr. J. Edwards, F.E.S., to whom most of the specimens have been submitted.

FULGORIDÆ.

Cixlus nervosus, L.—Coolmore. Carlingford. Slieve Gullion. Also recorded from Armagh (W.F.J.) Taken at Drogheda (G.H.C.)

C. cunicularis, L.—Fathom. Also recorded from Armagh and Ardara (W.F.J.)

C. pilosus, Ol.—Slieve Gullion. Also recorded from Armagh (W.F.J.)

CERCOPIDÆ.

Aphrophora alni, Fall.—Coolmore. Also recorded from Maghera, Co. Armagh; Bundoran and Ardara, Co. Donegal (W.F.J.) Common near Dublin (J.N.H.) Taken at Londonderry (Mr. D. C. Campbell).

Phllænus spumarius, L.—Coolmore. Dundalk. Recorded from Armagh, Bundoran, and Ardara (W.F.J.) Common in Co. Dublin (J.N.H.)

P. ilneatus, L.—Carlingford. Recorded from Ardara (W.F.J.) Common in Co. Dublin (J.N.H.)

IASIDÆ.

Ulopa reticulata, Fieb.—Slieve Gullion. Recorded from Churchill and Newtown-Hamilton, Co. Armagh, and Ardara. Also taken on Bray Head (J.N.H.)

* **Macropsis lanio**, L.—Fathom. Not previously recorded from Ireland, but was in the collection of the late A. H. Haliday.

Evacanthus interruptus, L.—Coolmore. Carlingford. Also recorded from Armagh and Ardara (W.F.J.) Common in Co. Dublin (J.N.H.)

* **E. acuminatus**, Fab.—Fathom. Not previously recorded from Ireland.

Tettigonia viridis, L.—Coolmore. Dundalk. Also recorded from Armagh (W.F.J.) Common in Co. Dublin (J.N.H.)

Acocephalus nervosus, Schr.—Carlingford. Also taken near Dublin (J.N.H.) Co. Antrim (Rev. A. Brennan).¹

* **A. albifrons**, L.—Coolmore. Has been taken in Co. Dublin (J.N.H.) Not previously recorded from Ireland, but was in the Haliday collection.

* **Athysanus obsoletus**, Kbm.—Dundalk. Slieve Gullion. Not previously recorded from Ireland.

PSYLLIDÆ.

* **Psylla costalis**, Flor.—Coolmore. Not previously recorded from Ireland.

* **P. peregrina**, Forst.—Coolmore. Not previously recorded from Ireland.

* **P. Forsteri**, Flor.—Coolmore. Has been taken near Dublin (J.N.H.) Not previously recorded from Ireland.

¹ G. B. Buckton—Monograph of the British Cicadæ. London, 1890.

COCCIDÆ.

Orthezia cataphracta, Shaw—Slieve Glah. Two females in moss at the foot of the mountain. Occurs also at Armagh (W.F.J.) We are glad to record new Irish localities for this interesting insect which Mr. H. C. Hart¹ found in Cos. Wicklow and Donegal. It is a northern species, occurring in Scotland, Northern England, Lapland, and Greenland, and has been found also in the alps of Styria, by Herr J. H. Läst.²

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a Wild Turkey from Dr. C. B. Ball, and a Barn Owl and a Sparrow-hawk from E. Popham, Esq. An Indian Antelope has been purchased, and a Pigmy Calf has been born in the Gardens.

4,500 persons visited the Gardens in February.

DUBLIN MICROSCOPICAL CLUB.

FEBRUARY 15th.—The Club met at Mr. A. ANDREWS'.

MR GREENWOOD PIM showed chlamydospores of a *Hypomyces*, probably *H. cervinus*, Tul., which occurred on *Helvella* gathered at Killakee last September. All the species of *Hypomyces* are parasitic on other fungi, usually Hymenomycetes. *H. cervinus* is the only one described in Plowright's monograph (*Grevillea*, Vol. XI.) as occurring on Ascomycetes (*Peziza morchella*). The specimen showed accorded very nearly with the figure in *Grevillea*, Tab. 155, f. 2, as well as agreeing in the matter of host plant.

MR MOORE showed specimens of *Cribraria aurantiaca*, Fr. They were found growing on some peat which had been imported from Hampshire, which was placed in a very hot, moist atmosphere. The fungus first made its appearance on pieces of the dead stems of *Pteris aquilina*, which were in the peat, and then rapidly spread over the whole surface of the pot of peat, six inches in diameter.

DR. SCOTT showed preparations and a pure culture of a micrococcus which occurred as an air contamination on a plate-culture in the laboratory of the Royal College of Surgeons. The naked-eye characters of the growth in the early stage were very similar to *Saccharomyces rosaceus*, but later on get a more waxy appearance, and a darker colour. The organism does not liquify gelatin, but grows slowly on the surface, at first pink, later of the colour known to artists as "light red." On agar-agar it forms a pure salmon-colour; on potato it is reddish. It is non-motile; in diameter about 0.001 m.m. These characters agree very closely with *Micrococcus carneus*, described by Zimmermann as occurring in the Chemnitz water supply.

PROF. G. COLE showed a large section of dolerite into which fine veins from eurite have been injected, from a composite dyke south of Bloody Bridge, coast of Mourne. The eurite veins run out from a dyke 7 feet wide, which has intruded into a very wide dyke of dolerite. A delicate interpenetration has occurred along the south plane of junction, and some of the minute veins contain products of fusion from the dolerite. The latter rock has been locally remelted by the invading mass, and both the veins from the eurite and the adjoining basic lava show traces of a vitreous condition, the veins being composed of spherulitic rhyolite.

¹ *Entomologist*, vol. xiii., 1880, p. 284, 304; See also J. W. Douglas, in *Ent. Mo. Mag.*, vol. xvii., 1880-1, p. 172, 203; and *Trans. Ent. Soc.*, 1881, p. 297.

² *Ent. Mo. Mag.*, vol. xxii., 1885-6, p. 240.

MR. G. H. CARPENTER showed a male specimen of the strepsipterous insect *Elenchus tenuicornis*, Kirb., which had been taken many years ago near Belfast by the late A. H. Haliday. This very rare species, which has only occurred elsewhere in Britain at a few localities in the south of England, was long believed to be parasitic on bees, like *Stylops*, but Mr. E. Saunders recently (*Ent. Mo. Mag.*, 1892) obtained in Surrey a male in the act of emerging from a larval homopteron of the genus *Liburnia*. The female of *Elenchus* is still unknown. The *Stylopidae* are considered by some authorities to form a special order of insects (Strepsiptera), but they are now generally believed to be abnormal coleoptera, related to the *Meloide* and *Rhipiphoridae*, which they resemble in their transformations—the larva being at first active and campodiform, afterwards legless and parasitic.

MR. H. H. DIXON showed a transverse section of a leaf of *Dendrobium teretifolium* showing a peculiar passage, which runs down the axis of the cylindrical leaf. This passage when traced upwards is in communication with the exterior by a very minute opening placed laterally to, but very close to, the apex of the leaf. At the base the passage opens out into a funnel-shaped chamber which encloses the apex of the stem which bears the leaf, but which does not usually develop. The passage probably represents the upper surface which has become enclosed; it is lined by cells, closely resembling those of the outer epidermis, but considerably smaller. These lining cells are covered by a thick cuticle; however no stomata were found opening from the passage into the tissue of the leaf.

MR. A. F. DIXON exhibited a human embryo of about 25-27 days, according to the method of dating embryos adopted by Prof. His. The embryo appeared to be normally developed, showing the different organs to possess relatively the proper sizes. It measured about 5 m.m. in its longest diameter.

MR. M'ARDLE exhibited a specimen of *Jungermania cuneifolia*, Hook., which he recently collected at O'Sullivan's Cascade, Killarney. This curious liverwort appears to be confined to the Co. Kerry; it has never been found in fruit. Sir William Hooker, who figured the plant in his grand work on the British *Jungermania*, tab. 65, writes—"The fructification is not at all necessary for its identification, the leaves and stipules affording abundant characters by which it may be known from every other in the genus." The late Dr. Spruce in his exhaustive work on the Hepaticæ of the Amazon and Andes considers it belongs to his new genus, *Clasmatocolea*; the only known species is figured at tab. xx., and it certainly resembles very much the Irish plant. At p. 440 he states—"These curious little plants come very near *Lophocolea*, but are well distinguished by the peculiar habit; the assurgent leaves, with a plane antical margin—not convexo-deflexed, with the antical margin decurrent, and recurved at the base (as in *Lophocolea*); the biform underleaves, mostly entire, but some bifid. The perianth, turgid and indistinctly carinate, is so fragile that the slightest touch breaks off the short unequal lobes at the wide mouth. I cannot doubt that the Irish *Jung. cuneifolia*, Hook., hitherto known only from sterile specimens, is a true *Clasmatocolea*. Specimens gathered a few years ago on Mount Brandon by M'Ardle are so like the arcuate barren shoots of *Cl. fragillima* that until I compared them closely I thought them the same species. The Irish plant (like the Andine) has both entire and bifid underleaves, and was correctly so described by Nees from original specimens of Miss Hutchins." Mr. M'Ardle also exhibited drawings showing the arcuate and divaricately branched stems, decurrent leaves and biform stipules.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

MARCH 6.—The President (Prof. FITZGERALD) in the chair. Mr. R. PATTERSON read a paper on "The Occurrence of the Marten (*Martes*

sylovatica) in Ulster." Mr. R. M. YOUNG, B.A., read notes on "A recent Find of Irish Elk Bones, &c., in Belfast." The latter paper appears in our present issue, and the former one we will publish shortly. Mr. S. F. MILLIGAN, M.R.I.A., read a paper entitled "Social Pictures of Ancient Ireland."

BELFAST NATURALISTS' FIELD CLUB.

FEBRUARY 20th.—The President in the chair. Mr. JOHN CARDWELL read a paper on the ancient church of Lisnagarric, Co. Down. Messrs. W. GRAY, F. W. LOCKWOOD, and F. J. BIGGER (Secretary) criticised the paper.

Mr. R. LLOYD PRAEGER, in a short lecture, contrasted the flora of County Dublin with that of Counties Antrim and Down. He pointed out the differences in the geological and physical features of the two areas, and the extent to which these affect the floras; and stated that the Dublin flora differed from that of the Belfast district chiefly in containing many limestone-loving species, and others that affect light and gravelly ground. A representative collection of characteristic Dublin plants was exhibited. A discussion ensued, in which Rev. C. H. WADDELL, Prof. COLE, F.G.S., and Messrs. W. GRAY, S. A. STEWART, and F. W. LOCKWOOD took part.

A paper on Localities for Lepidoptera near Belfast, by Mr. C. W. WATTS, was read on his behalf by Mr. Praeger. The Secretary subsequently read, for Lt.-Colonel PARTRIDGE, a paper on the Lepidoptera of Enniskillen. The election of a number of new members brought the meeting to a close.

DUBLIN NATURALISTS' FIELD CLUB.

MARCH 13th.—The President (Mr. G. H. CARPENTER) in the chair. Prof. W. J. SOLLAS, F.R.S., gave a lecture upon Ancient and Modern Coral Reefs. After referring to the fact that the Carboniferous Limestone, which forms so large a part of the surface of Ireland, is composed of coral remains, Prof. Sollas gave an account of the various kinds of corals now to be found living in the Great Barrier Reef of Australia. The lecture was illustrated by photographs from Mr. Saville Kent's recent work. Profs. JOHNSON and COLE, Mr. DUERDEN, and the President took part in the discussion. Prof. SOLLAS, in replying, mentioned that an expedition is to be organised to investigate the formation of reefs, by means of deep boring.

NOTES.

Phenological Observations.—I am very anxious to obtain for the Royal Meteorological Society a few more phenological observers in Ireland, and more especially in the southern half of the Island. The duties of an observer are extremely simple, and consist in accurately noting each year the dates of first flowering of such well-known plants as the Hazel, Coltsfoot, Wood Anemone, Blackthorn, Hawthorn, &c., only thirteen plants in all. Observers are also required to note down the dates of arrival of the Swallow, Cuckoo and Nightingale among birds, the first appearance of the Honey Bee, Wasps, and Small White Butterfly among insects. To any who may be willing to send in observations, I shall be happy to forward a specimen-observing form and complete instructions.—EDWARD MAWLEY, Phenological Recorder, R. Met. Soc., Rosebank, Berkhamstead, Herts.

[We gladly publish Mr. Mawley's communication and hope his appeal will meet with several responses from our readers.—Eds.]

BOTANY.

PHANEROGAMS.

Artemisia Stelleriana.—The *Journal of Botany* for March contains an interesting and well-reasoned article by F. W. C. Areschoug on the distribution of this plant; the writer considers the plant to be probably native in Europe, and makes out a good case in support of his contention. This species is found in Scandinavia, Kamtschatka, and North America, in maritime situations where it could not easily have arrived by artificial means. Last season our correspondent, Mr. C. B. Moffat, discovered it growing on the North Bull in Dublin Bay, which is its first known station in Britain.

Irish Brambles.—In the *Journal of Botany* for March, Mr. Praeger publishes a list of *Rubi*, collected by him last season in the Counties of Dublin, Meath, Wicklow, Kildare, Queen's County, and King's County. This difficult genus has been so little studied by Irish botanists that the present paper extends the range of all the twenty-four brambles enumerated. Two of them, *R. fuscus* and *R. echinatus*, are additions to the Irish list, and the notes on the remainder furnish a large number of new district records.

ZOOLOGY.

INSECTS.

Irish Butterflies—*Lycæna artaxerxes* in Co. Galway.—The list of Irish butterflies in our last month's issue has already received an addition. In the *Entomologist* for March, Mr. R. E. Dillon records the capture of *Lycæna astrarche*, var. *artaxerxes*, Fab., at Clonbrock, in July, 1893, in a list of lepidoptera from that locality. The discovery of this North British form in western Ireland is of great interest. We learn from Mr. W. F. de V. Kane that the record of *Argynnis adippe* from Galway, by Mr. Harker, was erroneous, and that Mr. Dillon's record is therefore the only Irish one for this species.

BIRDS.

Waxwing in Co. Down.—On February 23rd I examined in the flesh a Waxwing (*Ampelis garrulus*), received from Portaferry, Co. Down. It is a male, immature, with seven "wax" points on each wing, and measures eight inches from point of bill to end of tail. It was picked up dead in a potato shed, and was much emaciated, weighing only $1\frac{1}{4}$ oz. Mr. Sheals, who kindly drew my attention to this rare visitor, remarks that the only other Waxwing he has passed through his hands was received on the same day last year—23rd February, 1893.—ROBERT PATTERSON, Malone Park, Belfast.

Snow Buntings in Kildare.—In the *Zoologist* for March Mr. A. W. Hasted writes that during the winters of 1891-92 and 1892-93 a great number of Snow Buntings (*Plectrophanes nivalis*) visited the Curragh of Kildare. They apparently have a very local distribution there, as none were seen in any portion of the country surrounding the Curragh, though they were abundant on the open downs of the Curragh itself.

MAMMALS.

The Marten in Ireland.—The *Zoologist* for March contains a valuable statistical article by the Editor (Mr. J. E. Harting, F.L.S.) on the distribution of the Marten (*Martes sylvatica*) in Ireland, in which all authentic records known to the writer are enumerated under counties. We trust that the appearance of this paper will lead our Irish naturalists to contribute what notes they have on the subject. We are aware that some of them possess information that will considerably supplement the records given in the present paper.

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CROSS DYKE, MACEDON POINT, WHITEHOUSE (Fig. 1)



NORTH STAR DYKE, BALLYCASTLE (Fig. 2).

From Photographs by Mary K. Andrews.]

The Irish Naturalist.

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MAY, 1894.

No. 5.

DYKES IN ANTRIM AND DOWN.

BY MARY K. ANDREWS.

THE study of every portion of the earth's crust is instructive, but the margin of our coast-lines is specially invested with the most varied and peculiar interest. Here we seem to gain a fuller insight into the architecture, so to speak, of the earth; the sea, aided by the various sub-aerial denuding agents, rain, frost, wind, &c., constantly wearing down and wearing back the coast-lines, as constantly bringing fresh surfaces to light. Independently of this ceaseless change, there is another reason why this belt of the lithosphere should claim our attention and excite our interest. It is here that we find some of the grandest displays of volcanic action. If we take the borders of the Pacific on the one side, from Cape Horn to the Aleutian Islands, on the other from Kamtschatka to Victoria Land, we find it encircled by volcanic cones, the greatest energy, at the present day, centring around the Sunda Strait. The detonations of Krakatoa in August, 1883, are still fresh in our memories.

Traversing the Atlantic Ocean from Greenland to Tristan d'Acunha, we have a more interrupted series of volcanic mountains; many are apparently extinct, but we find active vents in Iceland, in the Azores, in the Canaries and in other islands. In this sinuous band, the volcanic rocks of the North-East of Ireland may be included; its sheets of basalt and characteristic dykes remain witnesses to the igneous energy of the Tertiary Period.

Fringing this basaltic plateau, we have very interesting groups of dykes, a few, such as those at the Cave Hill, being exposed at considerable elevations. Several series are well seen on either side of Belfast Lough at low water. Those between Lower Whitehouse and Whiteabbey are particularly

striking: traversing the Triassic strata of the district in a general north-westerly direction, they appear as low wavy walls of dark rock, very slightly raised above the surrounding reefs. Macedon Point appears to have been in proximity to a special centre of disturbance, for here we find two dykes intersecting, thus forming a beautiful example of a cross dyke (fig. 1).

Immediately opposite, in Cultra Bay, we find dykes striking out to sea, in similar wavy lines, and traversing strata of very varied geological age.

Carrickfergus Castle stands upon one of the largest dykes of the district; the basalt of which it is composed is more coarsely crystalline than the basalt at Macedon Point, and is well exposed to view below and between the castle walls. This dyke forms a landmark of both geological and historic interest; it shows how the original line of weakness in the earth's crust, now strengthened by the filling in of consolidated lava, has offered more resistance to erosion, than the surrounding strata; and how man, seizing upon the position thus prepared by nature, has raised his structure on the point of strength due to the igneous action of bygone ages.

The basaltic dykes of our northern coast do not always strike out to sea in irregular branching lines; they sometimes rather present the appearance of artificial masonry composed of roughly rhomboidal blocks of basalt, such as "North Star" dyke (fig. 2). This remarkable dyke traverses the Carboniferous beds at Colliery Bay, and is known in the neighbourhood as the "Black Ditch." It forms one of a series of interesting dykes close to Ballycastle, which attracted the attention of Dr. Hamilton, more than one hundred years ago; in 1784 he describes them "as extraordinary partitions of basaltes, which like walls of iron intersect the strata attendant on the coal of that place, and divide in twain the solid precipice from its summit to the base." Thirty years later Dr. Berger read an interesting paper "On the Dykes of

¹ "Ditch" is sometimes understood in Ireland as equivalent to "fence" or "bank." This recalls the old term "whyn-dykes," which Dr. Richardson tells us "obtained in Scotland the name of *dykes* from serving often as fences, and from their material, that of *whyn*, the Gaelic name for basalt." Appendix to Dubourdieu's Statistical Survey of the County of Antrim, p. 68.

the North of Ireland" before the Geological Society. Although he found dykes at various altitudes, more than half of those he observed were situated on the sea-shore. From a careful determination of their compass bearings, he found their general uniform direction to be from south-east to north-west.

In the County of Down, we have a very interesting outlier of the Basaltic Plateau of Antrim, Scrabo Hill, which may possibly have been connected in the Tertiary Period with the lava-sheets north of Belfast Lough. It contains very striking examples of dykes, laid open in the faces of its various quarries. The dolerite of Scrabo not only overlies the Triassic sandstone of the hill, but has intruded along lines of weakness, in great horizontal sheets, the edges of which appear in the exposed sections as horizontal wavy dykes. In one quarry, the whole strata are traversed by a great vertical dyke, which not only cuts through the horizontal intrusive sheets, and intervening beds of sandstone, but pierces the capping of dolerite above. This vertical dyke stands out as a great leaning pillar against the hill; it is of looser texture than the intrusive sheets, and shows a tendency to spheroidal weathering.

In the present paper, I have only dwelt on a few out of the many characteristic dykes of our district; examples could easily be multiplied, and their study offers an interesting field of research.

Some geologists refer the basalt sheets of our plateau to "fissure" eruptions, others refer them to eruptions from volcanic cones, long since obliterated by glacial action. It is not easy to obtain direct proof where so many of the original fissures must be concealed by the superincumbent masses. The thought indeed sometimes forces itself, may not the one form of eruption merge into the other, without any special surface of demarcation? To trace, where it is possible, the connection between the dykes, and the supposed old volcanic "necks" of the district might lead to interesting results.

To these sheets of basalt we owe the preservation of much of our land-surfaces; they have suffered denudation through the ages, but the denudation would have been much greater, had the softer strata been exposed to it unprotected.

It is in the balancing between the external and internal energies of the globe, that we find the conditions necessary

to the preservation of life upon the earth, and nowhere can the varied phenomena peculiar to each be studied with greater advantage, than in the numerous dykes that have added so much to the strength and beauty of our Northern Coast.

THE PLANTS OF WESTMEATH.

BY H. C. LEVINGE, D.L.

(Continued from page 80.)

LIST OF SPECIES.

Thalictrum minus, L.—Shores of Hare Island in L. Ree, B. & V., and shores of L. Ree, J.F.

T. flavum, L.—Ladestown, near L. Ennel! Dysart, near Delvin, Miss E. Reynell.

Ranunculus pseudo-fluitans, Bab.—L. Owel, near Portloman; not previously recorded from Co. Westmeath.

R. trichophyllus, Chaix.—L. Owel, with the last, near Portloman! and in a drain near Ballykeen, L. Ree, B. & V.

R. Drouetil, Godr.—(VII.) River Gaine, Knock Drin.

var. **Godronii**, Gren.—(VII.) Road ditch, Quarry Bog, Knock Drin.

R. sceleratus, L.—Scraw Bog, Loughanstown! near Athlone, B. & V.

R. Lingua, L.—N.W. end of L. Owel! and in "suitable places" all round L. Ree, B. & V. But otherwise not previously recorded from the Co. Westmeath.

R. auricomus, L.—In woods at roadside near Belvedere.

‡ **Aquilegia vulgaris**, L.—Near Killynion, Miss E. Reynell! and near Coosan Point, L. Ree, B. & V.

Papaver Argemone, L.—Sparingly on the sides of L. Ree, B. & V.

P. dubium, L.—Knock Drin and Drinmore! not previously recorded from the Co. Westmeath.

Fumaria confusa, Jord.—(VII.) Knock Drin.

* **Cheiranthus Cheiri**, L.—Old toll gate at Athlone, B. & V.

Nasturtium palustre, DC.—Shores of L. Ennel.

N. amphibium, R. Br.—Frequent in drains all round L. Ree, B. & V.

Cardamine flexuosa, With.—(VII.) Knock Drin, frequent in the woods.

Sisymbrium officinale, Scop.—Near Mullingar and elsewhere! but not previously definitely mentioned from Westmeath, though said to be common near L. Ree, B. and V.

S. Alliaria, Scop.—Knock Drin, and on the stony shores of Lough Derevaragh at Knock Ross.

* **Erysimum cheiranthoides**, L.—Knock Drin, not previously recorded from the county.

† **Senebiera Coronopus**, Poir.—Roadside near Athlone, B. & V.

Raphanus Raphanistrum, L.—Drinmore, Knock Drin! and near Ladywell, B. & V.

Viola palustris, L.—Lisclogher Bog, near Bracklyn.

† **V. odorata**, L., var. **alba**, Besser.—(VII.) Wood near the old mill. Knock Drin, well established.

V. tricolor, L.—Lisclogher Bog road, Miss Levinge; not previously recorded from the county.

Polygala serpyllacea, Weihe.—(VII.) Bog banks, N.W. end of L. Derevaragh.

Lychnis diurna, Sibth.—Knock Drin woods; plentiful.

Cerastium glomeratum, Thuill.—Knock Drin, abundant; not previously definitely recorded from this county, but common near L. Ree, B. & V.

C. triviale, Link.—Knock Drin, abundant, not previously recorded from the Co. Westmeath.

Stellaria glauca, With.—N.W. end of L. Owel! shores of L. Ennel, near the mouth of the Brosna! also near L. Ree, B. and V.

Arenaria trinervis, L.—Kilmaglish and Knock Drin.

A. serpyllifolia, L.—Top of Knock Eyon! and Coosan Point, L. Ree, B. and V.

Hypericum androsæmum, L.—On banks, Knock Drin, &c., frequent.

† **Malva moschata**, L.—Knock Drin, only once found.

† **M. sylvestris**, L.—Near the Crooked-wood.

† **Geranium pyrenaicum**, L.—Roadside between Mount Murray and Baronstown, Miss Levinge.

G. lucidum, L.—Roadside near Lynbury, and at Reynella.

G. Robertianum, L.—Near Donore, with white flowers; the type with pink flowers is the exception in that neighbourhood.

Rhamnus catharticus, L.—Knock Eyon, rare.

Medicago lupulina, L.—Knock Drin; not previously definitely recorded from the county, but said to be common near L. Ree, B. and V.

Ononis arvensis, Auct.—Only once seen in a field near Ladywell, B. and V.

* **Trifolium hybridum**, L.—(VII.) Knock Drin and Crooked-wood, in cultivated fields.

Lotus major, Scop.—(VII.) Knock Drin, not unfrequent.

† **Vicia hirsuta**, Koch.—(VII.) Knock Drin, rare.

‡ **V. tetrasperma**, Moench.—Knock Drin, rare.

V. sepium, L.—Knock Drin, not common.

Lathyrus palustris, L.—N.W. end of L. Owel, very luxuriant! and Temple Island, L. Ree, B. and V.

† **Prunus avium**, L.—Old wood, Knock Drin.

† **P. Padus**, L.—(VII.) Knock Drin woods.

Rubus idæus, L.—Plentiful at Knock Drin and elsewhere.

R. fissus, Lindl.—(VII.) Drinmore, in boggy soil.

R. suberectus, Anders.—(VII.) Quarry Bog, Knock Drin.

R. umbrosus, Auct. Angl.—(VII.) Shefin Hill, Miss Levinge.

R. Lindleianus, Lees.—(VII.) Knock Ross

- R. rusticanus**, Merc.¹—(VII.) Hedges about Knock Drin, common.
- R. macrophyllus**, W. and N.
 var. **Schlechtendallii**, W. and N.—(VII.) Knock Ross.
 var. **amplificatus**, Lees.—(VII.) Knock Ross.
- R. pyramidalis**, Kalt.—(VII.) Knock Ross. Mr. E. F. Linton remarks on this "rather more hairy, and rather less glandular than usual."
- R. Drejeri**, G. Jansen.—(VII.) Knock Drin.
- R. fuscus**, W. and N.—(VII.) Knock Drin and Knock Ross, frequent.
- R. dumetorum**, W. and N., var. **ferox**, Weihe.—(VII.) Knock Drin.
- R. coryllifolius** x. **cæsius**.—(VII.) Knock Ross.
- R. cæsius**, L.—(VII.) Knock Ross, on stony shore of Derevaragh.
 var. **ilgerinus**, Genev.—(VII.) Deer Park fence, Knock Drin.
 var. **intermedius**, Bab.—(VII.) Roadside hedge, Garraree, near Knock Drin.
- R. saxatilis**, L.—Knock Ross, abundant.
- Geum rivale**, L.—(VII.) Balrath, near Reynella, Miss E. Reynell!
- Agrimonia Eupatoria**, L.—Roadside between Mullingar and Sonna! and at Knock Drin, Miss Levinge, not common.
- Poterium Sangulsorba**, L.—Shore of Rinardo Bay, L. Ree, B. and V.
- Rosa spinosissima**, L.—Hare Island, L. Ree, Miss Levinge; not previously definitely recorded from this county, but reported as common near L. Ree, B. and V.
- R. tomentosa**, Sm.—Knock Drin; not previously definitely recorded from Westmeath; but said to be common near L. Ree, B. and V.
- † **R. rubiginosa**, L.—(VII.) Hedges in Loughanstown, Mr. Groves.
- R. arvensis**, Huds.—Roadside between Killynon and Reynella, Miss E. Reynell! not previously recorded from the county; but referred to District 7 by B. and V. St. John's Wood (the locality given) is, however, in District 9, Co. Roscommon.
- † **Pyrus Aria**, Sm.—Knock Drin woods; not previously definitely reported from this county, but said to have been found in most of the islands in L. Ree, B. & V.
- Saxifraga Hirculus**, L.—Lisclogher Bog; I gathered a few specimens of this rare plant in August, 1888, in the same place where it had been formerly found by Mr. Reynell, *vide* "Cyb. Hib.," p. 117.
- S. tridactylites**, L.—Hare Island, L. Ree, Miss Levinge; not common in the county.
- S. hypnoides**, L.—Recorded as from a rock at Reynella; but it is not there now.
- Parnassia palustris**, L.—Shores of L. Derevaragh, Drinmore, and Knock Drin.
- Cotyledon Umbilicus**, L.—On ruins of Mortimer's Castle, near L. Derevaragh; rare.
- Drosera anglica**, Huds.—Lisclogher Bog.
- Myriophyllum verticillatum**, L.—(VII.) N. W. end of L. Owel, and a curious dwarf form near L. Ennel in 1893, growing on ground dry in the summer of that year, but usually submerged.
 var. **pectinatum**, DC.—Bog holes in bog of Lynn.
- M. spicatum**, L.—L. Owel and River Gaine at Kilmaglish; not common.
- M. alterniflorum**, DC.—Brittas Lake and holes in Quarry Bog; not previously definitely recorded from this county, but referred to Dist. 7 by B. & V.; Kiltoom, the locality given, is in Roscommon, Dist. 9.

¹ *R. rusticanus* has been already recorded from District 7 in *Journal of Botany* for March, 1894 (p. 76).—Eds.

Epilobium palustre, L.—(VII.) Kilmaglish, also edge of L. Ennel.
Callitriche hamulata, Kuetz.—(VII.) L. Derevaragh, J. and H. Groves.

C. obtusangula, LeGall.—(VII.) L. Derevaragh, J. and H. Groves.

‡ **Myrrinium olusatrum**, L.—Donore, near the lake at the Boat Quay.

Conium maculatum, L.—Knock Drin; not previously recorded from the county.

Cicuta virosa, L.—Edge of L. Ennel, near the mouth of the River Brosna; this plant is said to be fatal to cattle, but it is regularly grazed down in this locality, and the owner of the farm assured me that no harm to his animals ensues.

* **Carum Petroselinum**, Benth.—(VII.) Established on an old wall at Knock Drin.

Slum latifolium, L.—Near Mullingar, J. F., and in many places along L. Ree, B. and V. I have not seen this in the county.

S. erectum, Huds.—Drains at Knock Drin.

‡ **Ægopodium podagraria**, L.—Killynion, Donore, &c.

Conopodium denudatum, Koch.—Knock Drin and Donore woods, plentiful; not previously definitely recorded from Westmeath, but said to be frequent along L. Ree, B. and V.

* **Myrrhis odorata**, Scop. — Crossadree Churchyard, Miss E. Reynell!

Anthriscus vulgaris, Pers.—In Westmeath, F. J. Foot. I have not seen this in the county.

Enanthe fistulosa, L.—Edge of L. Ennel! By the River Inny, B. and V.

Æ. phellandrium, Lam.—Growing to ten and twelve feet in length in deep water at Knock Ross and Knock Eyon in L. Derevaragh; not previously definitely reported from this county, but said to be common along L. Ree, B. and V.

† **Æthusa Cynapium**, L.—Knock Drin, not previously recorded from this county.

Daucus Carota, L.—Kilmaglish; not previously definitely recorded from this county, but it is common along the shores of L. Ree, B. and V.

Cornus sanguinea, L.—(VII.) Knock Ross, well established if it is not indigenous.

Galium boreale, L.—Shores of L. Ree, F. J. Foot and B. and V. I have not seen this in the county.

G. palustre, L. var. **elongatum**, Prest.—(VII.) Edge of Brittas Lake, Knock Drin.

G. uliginosum, L.—Lisclogher bog; Scraw bog, Loughanstown; bog of Lynn; shores of L. Drin and L. Owel.

Valeriana officinalis, L. var. **sambucifolia**, Mik.—Knock Drin and elsewhere; all the Valerians in this part of the county appear to be this variety.

Valerianella dentata, Poll.—Near Belvedere Lake, D. M. (*Cyb. Hib.*). I have not seen this.

Antennaria dioica, R. Br.—Knock Eyon, locally plentiful.

Achillæa Ptarmica, L.—Curraghbrack, not common in the county.

Anthemis Cotula, L.—Knock Drin.

Petasites vulgaris, Desf.—Ballynegall and Kilmaglish.

* **Doronicum pardallanches**, L.—(VII.) Killynion, Miss E. Reynell! Well established

Carlina vulgaris, L.—Knock Eyon and Knock Ross.

Carduus pycnocephalus, Jacq.—Roadside between Killynon and Reynella.

Cnicus pratensis, Willd.—At Ladestown, near L. Ennel.

C. Forsteri, Sm.—(VII.) N.W. end of L. Owel.

‡ **Centaurea Cyanus**, L.—(VII.) Knock Drin, in cultivated fields.

Crepis paludosa, Mœnch.—Scraw bog, Loughanstown, and shore of Derevaragh Lake, N. side of Knock Ross.

‡ **C. taraxacifolia**, Thuill.—Near Athlone and one or two other places, B. and V.

Hieracium umbellatum, L.—Hare Island, L. Ree, B. and V.

H. boreale, Fr.—Coosan point, L. Ree, B. and V.

Leontodon hirtus, L.—Shore of L. Derevaragh at Gartlandstown.

L. hispidus, L.—Fields near Creggan Lough, B. and V.

Sonchus asper, Hoffm.—Knock Drin; not previously definitely recorded from this county, but referred to Dist 7 by B. and V.

Vaccinium Oxycoccus, L.—Quarry Bog, Knock Drin, and Scraw-Bog at Loughanstown, where it is exceedingly abundant, forming dense masses. An abnormal growth of this plant is of frequent occurrence in both localities, caused by a fungus (*Exobasidium vaccinae*, Worsin). "This fungus attacks *Ericaceæ* and *Vaccinae* of many genera in all parts of the world, and many *Rhododendrons* in the Himalaya, with a general similarity in its effects. Some quite small-flowered American *Andromedas* produce under it flowers nearly three inches in diameter." Thus writes my friend Mr. C. B. Clarke of the Kew Herbarium, to whom I sent specimens, and by whom the plant was submitted to Mr. Cooke and other fungologists at Kew.

V. Vitis-Idæa, L.—Mr. A. G. More informs me that there is, in Dr. Moore's Herbarium, a specimen of this plant found on the greater bog of Bracklyn, which is about 280 feet above mean sea-level; I regret I have not had an opportunity of searching for it.

Andromeda polifolia, L.—Quarry Bog, Knock Drin, frequent in the county.

Pyrola rotundifolia, L.—Abundant in the 'Scraw bog,' Loughanstown, and Ballynegall, and sparingly in Lisclogher Bog.

P. minor, Sw.—This is said, in "Cyb. Hib." to have been found in the Ballygall (should be Ballynegall) demesne. I have searched carefully for the plant, but have not succeeded in finding it.

Primula veris x vulgaris, L.—Knock Drin old wood, rare.

Lysimachia vulgaris, L.—Quarry Bog, and N.W. end of L. Owel.

Samolus Valerandi, L.—Shore of L. Ennel at Ladestown.

Gentiana amarella, L.—Drinmore.

Myosotis cœspitosa, Schultz.—Edge of L. Derevaragh! not previously definitely reported from the county; but it is said to be more plentiful along L. Ree than any other of the genus, B. and V.

Lithospermum officinale, L.—Edmonton, Miss E. Reynell!

Solanum nigrum, L.—Knock Drin, several times seen in garden ground.

(TO BE CONCLUDED.)

RECORDS OF THE EXPORT OF IRISH WOLF-DOGS TO THE EAST IN THE 17TH CENTURY.

BY V. BALL, C.B., LL.D., F.R.S.

IN his interesting "Notes on the History of the Irish Wolf-dog," ¹ Prof. J. P. O'Reilly has given evidence of the importation of these dogs in the 17th and 18th centuries into Spain, where they were employed in keeping the wolves in check. I would refer to that paper readers who may desire to become fully acquainted with the subject, and with a philological investigation of the Continental terms which were applied to this variety of dog. Again, in his monograph on the Irish Wolf-hound ² Capt. G. A. Graham has given much information about the export of these dogs to England in the 16th, 17th, and 18th centuries. Exportation appears to have been progressing too fast, however, and in fact threatening extermination of the breed; for we find that

"In 1652 a Council Order of Cromwell's Government prohibited the export of Wolf dogs, and offered rewards of £5 and £6 respectively for male and female wolves."

On the present occasion I propose to quote certain authors in connection with the actual export of Irish Wolf-dogs to the far East, and the high esteem in which they were regarded there at a still earlier period. In the year 1617, during an interview between the Emperor Jahangir and Sir Thomas Roe, the former having spoken slightly of some presents which had been forwarded to the latter for distribution at Court, but which Jahangir had appropriated, added :

"I will keep them, and only desire you to help me to a horse of the greatest size. It is all I will expect, and a male and female mastiff, *and the tall Irish greyhounds*, and such other dogs as hunt in your lands, and if you will promise me this I will give you the word of a king I will fully recompense you, and grant you all your desires."

Sir T. Roe writes :

"I answered I would promise to provide them, but could not warrant their lives, and if they died by the way, only for my discharge their skins and bones should be preserved; he gave extraordinary bows, laid his hand on his heart, such kind gestures as all men will witness he never used to any man, nor such familiarity nor freedom, nor profession of love." ³

¹ Proc. Royal Irish Academy (3rd Ser.), Vol. i., 1890.

² Dursley, 1885.

³ Travels in India the 17th Century. London: Trubner, 1873, p. 91.

Rev. Edward Terry, Chaplain to Sir T. Roe, relates that in the present sent to Court, as above referred to, English and Irish dogs were included; but as only two out of eight arrived safely, it was for that reason that the Emperor desired more. He says:

"In the year I went to India, the merchants here (as from the King of England in whose name they sent all their presents), amongst many other things then sent the Mogul some great English mastiffs and some large Irish greyhounds, in all to the number of eight, dispersed in our several ships; one of these high-spirited mastiffs in our voyage thither, upon a day seeing a great shoal or company of porpoises, mounting up above the waves, and coming toward that ship wherein he was, suddenly leaped overboard to encounter with them, before any did take notice of that fierce creature to prevent that engagement, wherein he was irrecoverably lost, the ship then having such a gale of wind, that she could not suddenly slack her course, whereby that poor creature might have been preserved. Another, one of the Irish greyhounds, had his head shot off in our sight. The mangle was the destruction of four more of them, only two of the mastiffs came alive to East India, and they were carried up each in a little cart, when I went up to the Ambassador (at Agra) that he might present them to the Mogul."¹

He then describes how one of them broke loose and attacked an elephant.

Another Chaplain, the Rev. J. Ovington, who made a voyage to Surat in the year 1689, relates that

"A couple of Irish Wolf dogs were so prized in Persia, that they were taken as a welcome and admired present by the Emperor (Shah) himself. Two more of which (which were given to me by the Earl of Inchequin when we put into Kingsale (*sic*) after the voyage) I disposed of to the East India Company, who despatched them in their ships immediately to the Indies, to be there bestowed on some of the Eastern Courts."²

He then relates, as an example of the value set upon European dogs, how a combat between the armies of two nobles, in consequence of a dispute as to the ownership of an English mastiff, was narrowly avoided by a reference to the English president who decided the merits of the respective claims.

¹ A Voyage to East India. London, 1777, p. 140.

² A Voyage to Suratt. London, 1696.

INSECTS COLLECTED BY THE ROYAL IRISH ACADEMY FLORA AND FAUNA COMMITTEE,

1893.

BY REV. W. F. JOHNSON, M.A., F.E.S., J. N. HALBERT, AND
GEORGE H. CARPENTER, B.SC.

(Continued from page 89.)

COLEOPTERA.

THIS order of insects has yielded better results than any other. The following list of captures, with some notes on distribution, contains eighteen beetles (distinguished by an asterisk), which we believe to be new to Ireland. It is remarkable that some of the insects now recorded from Co. Donegal have in Great Britain a southern range, while several northern British forms have been discovered in the south-west of Ireland. We have to thank Dr. D. Sharp and Rev. Canon Fowler for identifying some of the more critical species.

CICINDELIDÆ.

Cicindela campestris, L.—Berehaven, common, especially in dry sandy places near the coast. This beetle seems widely spread in the south-west of Ireland, having been observed also at Sleah Head, to the west of Dingle (August, 1889).

CARABIDÆ.

Carabus catenulatus, Scop.—Hungry Hill. Ballyhaise, in moss on trees. Slieve Glah, under stones.

C. glabratus, Payk.—Mountains between Adrigole and Glengariff.

C. clathratus, L.—Slieve Mishkish.

These three species have not been hitherto recorded from the south-west of Ireland. The occurrence of the two latter is of great interest, as further evidence for the northern and alpine character of a section of the fauna of this mild southern region.

C. nemoralis, Müll.—Coolmore. Ballyhaise, Oak Wood. Slieve Glah, remains under stones.

C. granulatus, L.—Coolmore. Slieve Glah, remains under stones; no living specimen found. Dursey. Near Killarney.

Notiophilus biguttatus, F.—Coolmore. Dundalk. Ballyhaise.

N. substriatus, Wat.—Coolmore. Culragh Lough. Dursey; an addition to the fauna of S.W. Ireland.

N. aquaticus, L.—Coolmore. Ballyhaise.

N. palustris, Duft.—Coolmore.

Nebria brevicollis, F.—Cavan. Berehaven. Killarney, common.

Pelophila borealis, Payk.—Banks of R. Erne above Ballyshannon, under stones, pretty numerous.

Blethisa multipunctata, L.—Coolmore, in a marsh.

Elaphrus riparius, L.—Coolmore, and banks of R. Erne near Ballyshannon.

E. cupreus, Duft.—Coolmore, banks of R. Erne. Near Dundalk, in marshy field.

Clivina fossor, L.—Coolmore. Shores of Lough Oughter.

Dyschirius polltus, Dej.—Coolmore, on sandy beach in company with *Bembidium pallidipenne*, both appearing to prey upon the *Bledius* which abounded in the same spot.

D. globosus, Herbst.—Coolmore, under stones by a small stream.

Broscus cephalotes, L.—Coolmore, very numerous.

Badister bipustulatus, F.—Coolmore. Near Cavan.

Chlænus nigricornis, F.—Coolmore, and banks of R. Erne near Ballyshannon.

Bradycellus verbascl, Duft.—Coolmore.

Harpalus rupicola, Sturm.—On the shore at Greenore. This is the only locality as yet for this beetle in Ireland. Rev. W. F. Johnson took it there in 1888, *vide Ent. Mo. Mag.*, vol. xxv., p. 140. In England it seems confined to the east and south.

H. ruficornis, F.—Coolmore.

H. æneus, F.—On the beach at Greenore.

H. latus, L.—Ballyhaise.

Pterostichus cupreus, L.—Coolmore.

P. versicolor, Sturm.—Bere Island, a very dark form.

P. madidus, F.—Coolmore. Near Cavan, common.

P. niger, Schall.—Fathom. Dundalk.

P. vulgaris, L.—Coolmore. Slieve Gullion. Fathom.

P. anthracinus, Ill.—Common under stones on Lough Oughter shore. The only other Irish record is "near Belfast" by Haliday.

P. nigrita, F.—Coolmore. Berehaven. Shores of Lough Oughter.

P. gracilis, Dej.—Shores of Lough Oughter.

P. minor, Gyll.—Shores of Lough Oughter.

P. strenuus, Panz.—Coolmore.

P. diligens, Sturm.—Shores of Lough Oughter.

P. striola, F.—Coolmore. Slieve Gullion. Berehaven; this seems the commonest *Pterostichus* in the south-west, being found by everyone who collects in the district.

Amara spinipes, Duft.—Coolmore.

A. bifrons, Gyll.—Coolmore.

A. communis, Panz.—Coolmore.

Calathus cisteloides, Panz.—Coolmore.

C. fuscus, F.—Coolmore, at roots of *Amnophila*.

C. melanocephalus, L.—Coolmore.

var. **nubigena**, Hal.—Coolmore. Slieve Glah. Dursey. This interesting melanic variety was until lately known only from considerable altitudes. Two of the above localities, however, are near the sea-level. Dr. Scharff also has taken it on the Aran Islands in Galway Bay, at a moderate elevation. It occurs also on the Faroë Islands.

C. piceus, Marsh.—Ballyhaise, Oak Wood.

Taphria nivalls, Panz.—Coolmore.

Anchomenus angusticollis, F.—Banks of R. Erne above Ballyshannon under stones, pretty numerous.

A. albipes, F.—Coolmore. R. Erne. Cavan. Hungry Hill, common.

A. oblongus, Sturm.—Shores of Lough Oughter, very common under stones.

A. marginatus, L.—Coolmore.

A. parumpunctatus, F.—Coolmore. Shores of Lough Oughter. Killarney.

A. viduus, Panz.—Shores of Lough Oughter.

A. micans, Nic.—Shores of Lough Oughter.

A. fuliginosus, Panz.—Ballyhaise.

A. gracilis, Gyll.—Coolmore.

Bembidium rufescens, Guer.—Coolmore, common in tufts of grass on the cliffs. Near Ballyhaise in moss on banks of R. Annalee.

B. obtusum, Sturm.—Shores of Lough Oughter.

B. Mannerheimi, Sahl.—Coolmore.

B. Clarki, Daws.—Coolmore. The only other Irish record is Armagh.

B. lampros, Herbst.—Coolmore. Dursey.

* **B. nitidulum**, Marsh.—Coolmore, under stones in a damp piece of ground close to the beach.

B. femoratum, Sturm.—Coolmore, in company with the last.

B. bruxellense, Wesm.—Shores of Lough Oughter.

B. saxatile, Gyll.—Coolmore with *B. femoratum*.

B. littorale, Oliv.—Coolmore. Shores of Lough Oughter.

B. pallidipenne, Ill.—Coolmore, in great numbers on the sandy beach, evidently preying on *Bledius*.

Trechus lapidosus, Daws.—Coolmore, rare.

T. minutus, F.—Coolmore.

Dromius linearis, Ol.—Coolmore. Carlingford.

D. quadrimaculatus, L.—Ballyhaise under bark. Killarney.

D. melanocephalus, Dej.—Near Cavan, common.

HALIPLIDÆ.

Haliplus ruficollis, DeG.—Coolmore. Lough Oughter, in drains.

DYTISCIDÆ.

Laccophilus interruptus, Panz.—Coolmore, in drains.

L. obscurus, Panz.—Lough Oughter, in drains.

Cœlamбус quinquelineatus, Zett.—Coolmore. Lough Oughter, in drains.

C. novemlineatus, Steph.—Coolmore, plentiful in a drain leading into a brackish piece of water. The only other Irish locality is Armagh.

C. impressopunctatus, Sch.—Coolmore, plentiful in company with the last named species. The other Irish records are Waterford (the late Dr. Power) and Killarney (Mr. Wollaston). A single specimen has occurred at Armagh.

Hydroporus vittula, Er.—Coolmore.

H. palustris, L.—Coolmore. Lough Oughter, in drains.

H. erythrocephalus, L.—Coolmore.

H. obscurus, Sturm.—In a small pool near the top of Slieve Glah.

H. pubescens, Gyll.—Lough Oughter, in drains.

H. lituratus, F.—Lough Oughter, in drains.

Agabus sturmi, Gyll.—Coolmore.

A. bipustulatus, L.—Coolmore. Lough Oughter, in drains.

Ilybius fuliginosus, F.—Lough Oughter, in drains.

I. ater, DeG.—Coolmore.

Dytiscus punctulatus, F.—Lough Oughter, in drains.

GYRINIDÆ.

Gyrinus natator, Scop.—Coolmore.

* **G. elongatus**, Aubé.—Coolmore, in pools.

G. bicolor, Payk.—Coolmore. Armagh is the only other Irish locality.

G. marinus, Gyll.—Berehaven.

* **G. opacus**, Sahl.—Adrigole. An interesting addition to our Irish fauna, especially as it appears to be a northern species in Great Britain, yet occurs here in the south-west.

(TO BE CONTINUED.)

NOTES ON OCCURRENCES OF THE MARTEN
(*MARTES SYLVATICA*) IN ULSTER.

BY ROBERT PATTERSON, F.Z.S.

UP to the year 1879 two species of Marten were supposed to inhabit the British Islands, the Pine Marten and the Beech Marten. The chief external difference was in the breast-spot; in the Pine Marten it was yellow or cream-colour; in the Beech Marten it was white or whitish. There were other slight external differences, and the shape of the skull and size of the teeth were supposed to distinguish the two species. The habits of the two were also said to be different, the Pine Marten frequenting Pine trees, and the Beech Marten Beech trees, as well as mountains and rocks, while the latter was said to be much more bold and daring.

In 1879 the late Edward Alston, who was an authority on the subject, stated that in his opinion the Beech Marten (which is the common Marten of the Continent) is not, and never was, a member of the British fauna. "During the last ten years" (1869-79), he adds, "I have missed no opportunity of examining native Martens, and have endeavoured to trace out every supposed Beech Marten that I could hear of. I have thus seen a very large number of specimens from various parts of England, Wales, Scotland, and Ireland, and every one has proved to be *Martes sylvatica*, the Pine Marten." It is greatly to the credit of our Irish naturalist, the late William Thompson, of Belfast, that, prior to 1852, he had arrived at somewhat similar conclusions, remarking that the yellow colour on the breast of the young gave place to white in the adult. He considered this a satisfactory explanation of the fact that the yellow-breasted form should be the more common with us, as the *young* of all animals more easily fall victims to man. Of thirteen Martens received by Mr. Sheals, taxidermist, Belfast, not one had the white breast.

Martens are very destructive to every kind of game, and consequently are trapped and killed by game-preservers on every occasion. They reside chiefly in trees, and prey upon birds, squirrels, and other small animals. But they will also descend to the ground and destroy not only mice, rats, rabbits, and hares, but even lambs. Thompson relates that a farmer in the

neighbourhood of Donard Lodge, Co. Down, "had fourteen out of twenty-one lambs killed in one night, and the destroyers contented themselves with sucking the blood of their victims. On the following night the remaining seven were treated in a similar manner, and a couple of Martens were seen taking their departure from the scene of devastation." They were traced, and were found to have taken up their abode in a deserted Magpie's nest in Tollymore Park. In 1881, as I am informed by Mr. Ussher, a mother and two big young Martens were killed at Oaklands, Co. Wexford. There had been a destruction of lambs in the vicinity which was attributed to Stoats, but the bites in the necks were larger than those made by the latter animal. We need not therefore be surprised that the Marten is becoming rare, in Ulster at all events. In the following brief notes on its occurrences in our province, I begin on that foundation-stone of most branches of Irish Zoology—Thompson's "Natural History of Ireland." I have to thank many landlords and game-keepers for information cheerfully given, and I have especially to thank Mr. Sheals, of Corporation-street, Belfast, for valuable records taken from his books. I give the counties in alphabetical order.

CO. ANTRIM.—Thompson mentions the following localities where the Marten has occurred:—Glenarm Park, Glenariffe, Shane's Castle Park, vicinity of Larne, Tullamore Lodge, Castle Dobbs, and Malone House, within four miles of Belfast. At the latter place, he says, a pair of Martens were discovered in possession of a Magpie's nest; similar cases occurred in Tollymore Park and Belvoir Park, Co. Down. In the Belfast Museum the only Ulster specimen we had until quite lately is labelled "Toome Bridge, Co. Antrim, May, 1851." About forty years ago one was trapped at Garron Tower. In 1866 two were trapped in Glenarm Deer-park, as I am informed by Lord Antrim. In 1871 one was taken at Shane's Castle, and another in 1884 at Glenarm—a very fine specimen, weighing 5 lbs. Then comes an interval of nine years, during which I have no records from Co. Antrim, until last year—1893—when three specimens were taken—one in Glenarm Park in February, one in March at Portglenone, and one in May at Templepatrick. Mr. Montgomery, of Benvarden, Dervock, informs me that one of his game-keepers saw last spring an animal which, from his description, seems to have been a Marten, and as Portglenone is only about 12 miles distant, this was probably the one trapped in March. Lord Templetown's game-keeper informs me their specimen was the first seen there for over 45 years.

CO. ARMAGH.—Lord Gosford's demesne, Churchhill, and Tanderagee are given by Thompson. Sir Wm. Lenox-Conyngham writes me that one was caught at Churchhill about 25 years ago, and the specimen is

preserved. One was taken at The Argory about 24 years ago, as I am informed by Captain Shelton, who kindly sent me the skin for inspection.

Co. CAVAN.—No records.

Co. DONEGAL.—Thompson says:—"J. V. Stewart notes the yellow-breasted Marten in his catalogue of the mammalia of this county." It is also mentioned by the late Col. J. Whyte. About 25 years ago a pair nested in the thatch of an outhouse near Coxtown. Major Hamilton, of Ballintra, writes that in one year, between 1865 and '70, he shot one and trapped another, and he had trapped some before these dates. He says, "They used to steal plums on the garden wall, and be caught on the top of it, but I cannot tell the dates or numbers. I have never seen any since, though I have heard of one." Mr. H. C. Hart saw one at Glenalla in 1879, and in 1880 two were obtained, one at Horn Head, and one at Ards. About 1883 two were trapped in a demesne three miles from Ballyshannon, and in September, 1883, one was killed not far from the town of Donegal. Some years ago two were taken on a mountain near Glenties. I am informed they have been occasionally seen in Glen Veagh and near Lough Esk.

Co. DOWN.—In this county Hillsborough Park, Tollymore Park, Donard Lodge, and Belvoir Park, are mentioned by Thompson as former haunts. There were some in Portavoe in 1854. In 1874 or '75 one was trapped near Castlewellan, as Dr. Gray kindly informs me. This specimen measures 2 feet 7½ inches over all. In 1882 one was killed at Castle Ward, near Downpatrick, and a particularly fine specimen from Narrow-Water Castle was received by Mr. Sheals in January, 1886. In April, 1891, one was trapped at Finnabrogue, Downpatrick, and was most generously mounted and presented to the Belfast Museum by Major Maxwell. In October of the same year (1891), another was killed by Lord Roden's keeper at Bryansford. It measured 28 inches, weighed 3½ lbs., and had evidently been trapped before, as one foot was gone. Two were taken some years ago at Montalto, Ballynahinch.

Co. FERMANAGH.—Thompson's only locality in this county is Florence Court. In former times it was frequently found in wooded demesnes along the shores of Lough Erne, but now seems very rare. The last Marten seen at Florence Court was killed by Lord Enniskillen about 30 years ago. One was got in July, 1869, at Killaleas, Lough Erne. The Earl of Erne kindly sends me the following information. "About 20 years ago, I killed a Marten Cat while cover-shooting on an island in Lough Erne, forming part of the Erne demesne. I never saw one there before or since. I recollect an old man, tenant of a farm on the island, who happened to be with me at the time, saying that they were very plentiful when he was a boy, but that he had not seen one for at least 40 years." Captain Archdale states that Martens were not at all uncommon about Irvinestown 70 years ago, and that they were very destructive to wall-fruit. It is 14 years since one was shot at Castle Archdale, and for 20 years previously they were only occasionally seen.

Co. LONDONDERRY.—Thompson mentions Castledawson; I have no recent records.

Co. MONAGHAN.—My only note for this county is one on the authority of Sir John Leslie, who informs me that a Marten was trapped by his keeper at Glasslough in 1891.

Co. TYRONE.—On the 24th June, 1887, Mr. Sheals received a Marten from Cookstown; I have no other records.

I am well aware this list of recent occurrences must be very far from complete, but I would express the hope that the publication of it will be the means of bringing in fresh information about this interesting and scarce animal. Almost nothing is known about its occurrences in Counties Armagh, Cavan, Londonderry, Monaghan, and Tyrone, and I shall be very grateful for notes from these counties. All communications addressed to me at Malone Park, Belfast, will be promptly acknowledged.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise fresh-water fish from F. Godden, Esq.; two pairs of Pigeons from J. B. O'Callaghan, Esq.; and a Heron from T. Harey, Esq. Twelve monkeys and forty Water-fowl have been acquired by purchase.

12,900 persons visited the Gardens in March.

DUBLIN MICROSCOPICAL CLUB.

MARCH 15th—The Club met at Mr. W. ARCHER'S.

PROF. COLE exhibited a section and specimen of a Variolite (altered coarsely spherulitic basalt glass), from near Ballagh Bridge, coast of Mourne, a fifth locality for this rare rock in the British Isles. The distinction between the dusky spherulites and the green altered glassy groundmass is well seen in this example, which is, as in other cases, clearly the result of rapid cooling of a basalt dyke.

Professor Cole also exhibited a section from another of the numerous dykes of Mourne, in which skeleton-crystals of the constituents of basaltic andesite have developed with a beauty and abundance such as occurs more usually in artificial slags.

PROF. T. JOHNSON exhibited a living specimen of *Halosphaera viridis*, Schmz., a minute globular green alga, which was found floating at the surface of the sea by the exhibitor, when with the fishery survey boat "Harlequin," in April, 1891, off the coast of Galway. The material exhibited had been sent from Plymouth by Mr. Garstang, who had taken it there in the tow-net for a month past. The life-history of the weed is incompletely known, and it is hoped, by the examination of specimens now under cultivation, to make it known. *Halosphaera* was first observed at Naples, several years later at Plymouth, by Mr. Cunningham, and in 1891 along the south and west coasts of Ireland. As a source of food supply and as an oxygenator of the sea-water it must be regarded as an important economic plankton member.

Mr. G. H. CARPENTER showed female specimens of *Orthezia cataphracta*, Shaw, collected at the foot of Slieve Glah, Co. Cavan, by Mr. J. N. Halbert. This insect belongs to the *Coccidae*, and is covered with a white, waxy secretion, arranged in symmetrical plates. Two of these project

behind the body, forming a marsupium or pouch in which the eggs are carried. The winged male is very rare. This is a northern species ranging through Lapland, Greenland, Scotland, and northern England and Ireland; it has been found in recent years in the Styrian Alps. Mr. H. C. Hart was the first to notice it in Ireland (in 1880), in Cos. Donegal and Wicklow. Rev. W. F. Johnson has also found it near Armagh.

Mr. DUERDEN exhibited slides of *Campanulina turrita*, obtained from various parts of the coast of Ireland. This species, so far as is known, has only been obtained from Irish waters. It was first found by Professor Wyville Thomson in Belfast Lough, and the description of the species in Hincks's "Brit. Hydroid Zoophytes" is based upon his figure. At an early stage the colony is of a very simple type, single hydrothecæ rising from the creeping stolon. Later the colony becomes larger, and much branched. A fine colony, bearing the gonothecæ, was shown growing on the spider-crab *Stenorhynchus rostratus* and extending even to the ends of the antennæ.

Mr. H. H. DIXON showed longitudinal sections of the ovules of *Galanthus nivalis* and *Hyacinthus orientalis* stained in mixtures of saffranine and iodine green, and also of fuchsin and iodine green. With these stains the polar nuclei and the secondary nucleus of the embryo sac become red, while the nuclei of the antipodal cells become brilliant blue, *i.e.* the former are erythrophil, and the latter cyanophil. The synergidæ and the oosphere are faintly cyanophil. The nucleolus of the antipodal cells is small and stains brilliant red. There is a large red nucleolus in the oosphere. In the nuclei of the endosperm formed later on, there are very large and brilliant red nucleoli which, as is usual, are situated in a vacuole in the nucleus.

Mr. M'ARDLE exhibited *Colurolejeunea calyptrifolia*, Hook, a rare liverwort which is very minute, and is generally found growing epiphytic on the larger Hepaticæ. The leaves are two-lobed, the superior the largest, which is elongated and formed into a shape which, in no small degree, resembles the calyptra of some mosses; the opening at the base in the younger leaves is overlapped by half the sub-quadrate inferior lobe; the stipules (underleaves) are oblong, closely adpressed and deeply divided into two acute lobes. The specimens were collected at O'Sullivan's Cascade, Killarney, by exhibitor, in November, 1893. The plant is also remarkable as being the only British representative of the five known species which are placed in the genus by Dr. R. Spruce in his work on the Hepaticæ Amazonicæ et Andinæ. Mr. M'Arldle drew attention to an interesting article on the "Adaptation in Liverworts," published in the March number of *Natural Science*, by Mr. Jesse Reeves.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

APRIL 3rd.—Prof. WILLIAM KNIGHT, LL.D., lectured on the Higher Education of Women.

BELFAST NATURALISTS' FIELD CLUB.

MARCH 20th.—This was the annual meeting of the Microscopical Section. The Secretary of the Club, (Mr. F. J. BIGGER) read the report of the Section, which was adopted. Mr. P. F. GULBRANSEN read a paper entitled "Why do objects appear larger when viewed through a Microscope?" The Microscopical Committee was re-elected, with the addition of the name of Prof. Symington. The meeting then resolved itself into a conversazione, and the members examined the large display of microscopical objects and apparatus that was spread on the tables.

MARCH 29th.—Mr. WILLIAM GRAY, M.R.I.A., gave a lecture on the Holy Wells of Ireland.

APRIL 10th.—Mr. GEORGE COFFEY, M.R.I.A., delivered a lecture on the Pagan Cemeteries and Burial Customs of Ancient Ireland.

DUBLIN NATURALISTS' FIELD CLUB.

APRIL, 10th.—The President (Mr. G. H. CARPENTER) in the chair. Prof. JOHNSON, D.Sc., gave a short account of a group of microscopic plants which Bornet and Flahault in 1889 showed were active in the gradual but complete disintegration of empty molluscan shells. The perforating plants belong to the blue-green, green, and red sea-weeds, and in two instances to fungi. They are especially abundant in oyster, cockle, and razor shells, which they colour green, grey, &c. Half of the known species have been found within the last few years on different parts of the Irish coast, partly by expeditions under the auspices of the Royal Irish Academy. Reference was made to the discovery within the last fifty years by Carpenter, Duckett, Moseley, Duncan, and others of similar if not identical plants in recent and fossil corals, in foraminifera, fish scales, and calcareous pebbles. It was also mentioned that some of the boring plants are found in fresh water and also in shells of living animals.

Mr. J. E. DUERDEN, A.R.C.S., gave a paper on "Irish Polyzoa." He described the structure of those minute zoophytes, of which some form the horny skeletons popularly known as "sea-mats." At one time they were regarded as plants. Figures were thrown on the screen of some of the rare forms which have been dredged by the various surveys of the Royal Irish Academy. Several of the interesting fresh-water species obtained by Professor Allman from the Irish canals and other localities were next dealt with. At the close a demonstration was given of many of our common Irish forms, and rarer specimens were exhibited under the microscope. The President and Mr. R. LLOYD PRAEGER took part in the discussion which ensued.

Mr. GREENWOOD PIM exhibited a fine specimen of a fungus, *Morchella* near *Smithiana*, but possibly distinct, sent him on the previous day by a member of the Club, Mr. W. F. De V. Kane, from Ahascreegh, Co. Galway.

Mr. PRAEGER then exhibited specimens from Co. Armagh and Co. Derry of the very rare orchid *Spiranthes Romanzoviana*. He said that in the whole of Europe this plant was known to grow only in Ireland. For many years it was known only from Co. Cork, but its recent discovery in Armagh and Derry should encourage botanists to seek it elsewhere in this country, and he urged members visiting boggy districts in August, to look for this plant, which was as beautiful and interesting as it was rare.

CORK NATURALISTS' FIELD CLUB.

APRIL, 11th.—Annual Meeting. Prof. HARTOG, President, in the chair. The Treasurer's statement, showing a balance in hand of over £10, and the Report of the Committee were submitted and adopted. The Report states that the formation of the Club has interested and stimulated many in the study of natural history, and asks that increased zeal may be shown by the members in the coming year. The want of a club-room and museum is felt to be a drawback to the Club's work. The following officers were elected:—President—Prof. HARTOG; Vice-Presidents—Mr. D. LANE, Mr. W. H. SHAW, Miss MARTIN; Hon. Treasurer—Mr. J. GILBERT; Curator—Mr. R. H. PHILLIPS; Hon. Secretaries—Messrs. J. L. COPEMAN and BARRINGTON; Committee—Mrs. J. H. THOMPSON, Messrs. J. H. BENNETT, H. LUND, O. R. BERGIN, D. HUNTER, S. HARRINGTON, J. NOONAN, T. DILLON, J. M'KENZIE, and J. PORTER.

LIMERICK NATURALISTS' FIELD CLUB.

MARCH 6th.—A series of photographic lantern slides, showing various forms and stages of Pond Life, were exhibited by the aid of Mr. B. BARRINGTON's lantern, also living specimens of *Volvox*, *Hydra*, *Cyclops*, *Stentor*, &c.

MARCH 20th.—Mr. J. STEWART delivered an interesting address descriptive of ants, their habits, varieties, and distribution, illustrating the subject by means of some very beautifully-coloured diagrams and lantern transparencies, also living specimens from this neighbourhood.

ROYAL DUBLIN SOCIETY.

FEBRUARY 21st.—A paper upon Eozoonal Structure in the limestone rock of Monte Somma, by DR. J. W. GREGORY, F.G.S., and PROF. H. JOHNSTON-LAVIS, F.G.S., was communicated by Prof. Cole. The authors show that the limestone blocks of Mesozoic age in Monte Somma (Vesuvius) have frequently become metamorphosed into crystalline masses consisting of alternating bands of calcite and various silicates. The authors regard the silica, magnesia, &c., as derived from the igneous rock, by chemical interpenetration and interaction. Where the silicate, as often happens, is olivine (montecellite), or a pyroxene, a complete simulation of the structure of the supposed foraminifer *Eozoön canadense* is produced; the layers of silicates occur parallel to the surfaces of any igneous vein that may have intruded into the limestone, and they become closer to one another in the areas farther removed from contact. The "proper wall," the "stolons," and in places the "canal-system" of *Eozoön* are recognisable under the microscope; and the authors adduce evidence to show that the typical Eozoonal limestone of Canada may have arisen similarly as a product of contact-metamorphism.

Prof. GRENVILLE A. J. COLE, M.R.I.A., F.G.S., read a paper on Derived Crystals in Basaltic Andesite of Glasdrumman Port, Co. Down. A large composite dyke shows at this point a band of andesite on each side, from 4 to 17 feet wide, and a more recent dyke of eurite in the centre, 36 feet across. The eurite includes numerous blocks of andesite, and sends off veins into it; but the pyroxene and glass of the latter rock have become remelted at the contact, a delicate interpenetration of the two magmas has occurred, and the porphyritic crystals of quartz and pink felspar from the eurite are found completely surrounded by the dark andesite. Thus a pre-existing rock comes to include crystals derived from one that has subsequently invaded it, and hand-specimens, apart from study in the field, would be of a most misleading character.

NOTES.

BOTANY.

PHANEROGAMS.

Artemisia Stelleriana in Ireland.—Mr. Colgan follows up Prof. Areschoug's article in the March number of the *Journal of Botany* on the position of *Artemisia Stelleriana* in the European flora, by an examination of its claim to a place in the Irish flora, written in his usual careful style, and published in the April number of the same journal. Mr. Colgan's conclusion is that there can be no doubt that this plant is an introduction in its habitat on the North Bull. It appears that the plant was cultivated for many years at St. Anne's, and that the refuse from the garden there was shot on the foreshore within half-a-mile of where the plant now grows. Given a westerly wind and a rising tide, a few scraps of the *Artemisia* have floated across the narrow channel to the North Bull, and, as the plant is a particularly hardy and free-growing species, the mystery of its appearance is solved.

ZOOLOGY.

Fauna of Mulroy Bay, Donegal.—On August 14th last, Mr. R. D. Darbishire and Rev. A. H. Delap carried out some dredgings in Mulroy Bay, North Donegal. I am indebted to the kindness of these gentlemen for the notes, list of mollusca, and slide of foraminifera, from which the present note is compiled. Particulars:—Four dredgings taken with an 18-inch dredge in north loop of Mulroy—(1.) W. of Croghan Island, 21-25 fathoms; (2.) N. by W. of Croghan Island, 18-19 f.; (3.) S. and E. of Doherty's rock, 17-18 f.; E. of Lamb Island, 23-27 f. The result in all four scrapes was very similar—a fine, thick, black mud, not putrescent, with a little gritty sand and a few sharp quartz pebbles; only a few shells, live and dead. One or two scrapes were also taken at the mouth of Moross Channel, in a few fathoms depth; the dredge brought up abundance of living *Lima hians* from 2 f., on a sandy bottom, and from 5 or 6 f. in its nests among *Laminaria*; also a small feather-star in the stalked stage. The results were, as Mr. Darbishire remarks, very disappointing, and the fauna remarkable for its poverty; nevertheless, there are one or two interesting species, as I shall point out; and so little marine work has been done in Donegal that any acquisition to the knowledge of the fauna is desirable.

MOLLUSCA (determined by R. Standen):—*Lima hians* (Gm.)—alive and plentiful; *Mytilus edulis*, L. (young); *Montacuta bidentata* (Mont.)—valves; *Kellia suborbicularis* (Mont.)—valves; *Axinus flexuosus* (Mont.)—alive and plentiful; Mr. Darbishire writes that it came up alive in every haul; *Cardium edule*, L. (young); *Venus ovata*, Penn.—dead; *Tellina tenuis*, Da C.—valves; *Corbula gibba*, Olivi—a few alive, small; *Panopea plicata* (Mont.)—valves; *Saxicava rugosa* (L.)—valves; *Cyclostrema nitens* (Phil.); *Rissoa inconspicua*, Ald.; *R. striata*, (Ad.); *Turritella terebra* (L.); *Odostomia scalaris* (Phil.); *O. acicula* (Phil.); *O. spiralis* (Mont.); *O. interstincta* (Mont.); *O. insculpta* (Mont.); *O. pallida* (Mont.); *O. rufa*, Phil.; *O. turrita*, Han.; *O. unidentata* (Mont.); *Cerithium reticulatum* (Da C.); *Utriculus truncatulus* (Brug.); *Cylichna umbilicata* (Mont.). All the above univalves were dead. One or two species in the above list call for remark. *Lima hians* has been already recorded as plentiful at Moross by Mr. Hart (Zoologist, 1892); and this second note of its abundance there is interesting, as, excepting a single specimen dredged many years ago by the Ordnance collectors off Belfast Lough (Thompson), and another in the same locality by Groomsport fisherman (Proc. Belfast Nat. Hist. Socy., 1859) there is no other record of this pretty shell from Ulster. *Montacuta bidentata* is a rare shell in Ulster. *Axinus flexuosus*, though widely distributed, has apparently not been previously taken alive on our northern coasts. *Panopea plicata*—I know of no previous Irish record for this as a recent shell; it occurs in the estuarine clays of Belfast (Stewart) and Magheramorne, near Larne (Bell). *Odostomia rufa* (type) has not been previously recorded from the northern coasts, though its var. *fulvocincta* is not uncommon; I have to thank Mr. J. T. Marshall for kindly confirming the determination of this shell. Several of the other *Odostomia*, *Cyclostrema nitens*, and *Utriculus truncatulus*, have only once or twice been previously recorded from the northern province, and additional stations are welcome.

FORAMINIFERA (determined by Joseph Wright, F.G.S.):—*Bilocolina depressa*, d'Orb; *Miliolina seminulum*, Linn.; *M. sclerotica*, Kar.; *Haplophragmium canariense*, d'Orb; *Verneuilina polystropha*, Rss.; *Virgulina Schreibersii*, Cz.; *Bulimina pupoides*, d'Orb; *B. marginata*, d'Orb; *Bolivina lævigata*, Will.; *B. punctata*, d'Orb; *Lagena lævis*, Mont.; *L. lineata*, Will.; *L. gracillima*, Seg.; *L. sulcata*, W. and J.; *L. Williamsoni*, Alcock; *L. semistriata*, Will.; *L. squamosa*, Mont.; *L. hexagona*, Will.; *L. lævigata*, Rss.; *L. lucida*, Will.; *Nodosaria scalaris*, Batsch.; *Cristallaria crepidula*, F. and M.; *Uvigerina angulosa*, Will.; *Discorbina rosacea*, d'Orb; *Rotalia beccarii*, Linn.; *Nonionina depressula*, W. and J.; *Polystomella crispa*, Linn.; *P. striatopunctata*, F. and M.

Mr. Wright (to whom my best thanks are due for the above list) remarks that the species are such as would be likely to occur in almost any gathering at moderate depths around our coast.

A list of the worms, ascidians, &c., as determined by Mr. Darbishire and Prof. Herdman, is not at present available. The Holothurian *Synapta inharens* was taken, and the gephyrean *Phascolosoma vulgare* in the deeper water.—R. LLOYD PRAEGER.

INSECTS.

Early appearance of Butterflies.—The present season promises to be an early one. I caught a very fresh specimen of *Lycena argiolus*, a female, on the 26th of March, and on the 8th of this month (April), I saw a specimen of *Pararge egeria* in my garden. The Azure Blue is very common here in the woods of Curraghmore. One brood only has been observed, viz., in the spring—though I have often searched for it during the summer months. On looking over my note book I find that the above-mentioned dates are the earliest that I have observed these butterflies.—WILLIAM W. FLEMING, Coolfin, Portlaw, Co. Waterford.

Coleoptera at Bray.—On one of the fine days towards the end of March I collected for a few hours on Bray Head; many of the common Coleoptera were taken as well as a few local species, the latter perhaps worth recording. On the Head *Notiophilus aquaticus* was common, darting about at roots of heath; from under stones and in moss I obtained examples of *Bradycellus harpalinus*, *Byrrhus pilula*, *Orthocates setiger* (previously recorded from Portmarnock); by searching the trunks of fir trees about the foot of the hill, three good species of Coccinellidæ were secured, *Anaitis ocellata* (the variety with white surrounding the spots), *Adalia oblitterata*, and a nice form of *Mysia oblongoguttata*. On the heath *Lochmæa suturalis* and *Ceuthorrhynchus ericeæ* occurred commonly; and last but not least *Philocophthorus rhododactylus*, an interesting beetle living in the dead stems of furze and broom; it is apparently widely distributed over England and part of Scotland, but I can find no previous record from Ireland.—J. N. HALBERT, Dublin.

Stridulation of Corixa.—I have been asked to write an account of the stridulation of a *Corixa* I had in my possession for a short while. It was brought in a bottle of water from some distance in the country, but as I had had many of the same genus before, I took no particular notice of it. For two days after its arrival, however, I was worried by a sound, which I thought was produced by a cricket, but I could not locate it. On the third day I traced it to the vicinity of the jar, but had not the faintest idea that a water-insect was capable of making such a sound. The next day I caught the note distinctly as proceeding from the insect; at once I removed it to a clearer jar and began to watch it. I found that the sound was made by the rapid vibration, the clapping together, in fact, of two appendages, ivory-white like the smaller legs, that came into view between them while in use and then disappeared again. There were two different notes, one rather rare, but which when used preceded the more common one, was like the twittering of a bird and was produced by an upward rather than a lateral motion of the organs. The other, the principal note, was like the cry of the grasshopper I have heard abroad; it was very acute and shrill. I could hear it through much louder noises and through my own voice when reading aloud. It sang at intervals during the day, but regularly in the evening for hours; if the light were let in on it suddenly it stopped until the curtain was dropped again. This continued for eight or ten days when the creature died.—M. THOMPSON, Cork.

[This observation is of very considerable interest, as Mr. E. Saunders,

F.L.S. (with whom we have corresponded on the subject), tells us he has never heard of stridulation in these insects. He writes:—

"I cannot see what organs could be intended as the appendages 'like smaller legs,' I can only imagine that the coxæ must be meant, possibly, in a state of excitement, the legs might move rapidly and the coxæ show themselves unusually plainly, while all the time the stridulating noise might proceed from other organs altogether, no clapping together of the coxæ could produce a sound like a grasshopper's chirp as far as I can see—though the twittering mentioned might be due to such action."—EDS.]

AMPHIBIANS.

Frogs in the Mourne Mountains.—On Easter Monday, March 26th, while standing on the shores of Lough Bingian, a small lake situated in the heart of the Mourne Mountains, at an elevation of 1,350 feet, my attention was arrested by a curious, soft, purring sound, apparently proceeding from the upper end of the lake, about one hundred yards distant. On investigation I found this noise to proceed from an immense gathering of frogs, which were splashing about in the shallow water, and surrounded by large quantities of spawn. Every moment a number of frogs would raise their heads above the level of the water, and give vent to this croaking, which, however, resembled nothing so much as the purring of a cat. I endeavoured to form some estimate as to the number of frogs, and came to the conclusion that there must have been between 500 and 1,000. I may mention that the hour was about 1.30 in the afternoon, and the sun very bright and warm.—W. H. F. PATTERSON, Strandtown, Co. Down.

BIRDS.

Spring Migrants.—While walking along Bush Bay, near Giant's Causeway, on 27th March, I observed three Sand-Martins (two females and one male) flying backwards and forwards over the sand-dunes in the vicinity, as if they had just arrived. I had been on the look-out the previous day, but observed none. This locality is well suited for early arrivals on account of the heat arising from the sand, and the number of insects to feed on.—A. J. COLLINS, Belfast.

I heard the Chiff-chaff in Narrow-water Demesne, Co. Down, on March 24th. Mr. Robert Patterson writes me that he heard it at Belfast on March 25th. I heard the Corncrake at Cultra, Co. Down, on March 27th.—R. LLOYD PRAEGER.

It may be of interest that a Swallow was seen in Ormeau Park, Belfast, on April 5th. It did not stay here, but (as our earliest swallows seem to do) disappeared on the same day.—J. STELFOX, Belfast.

On Easter Sunday, 25th March, we saw about twelve House Martins flying along the Muckcross shore of the Lower Lake, Killarney, and we were informed by our boatman that he had observed them there on the previous Tuesday, 20th March, and that he had never seen them at Killarney in other years before the first week in April. Mr. A. G. More informs us that this is exceptionally early. On 23rd March, near Newcastle, Co. Wicklow, we heard the Chiff-chaff. The Corncrake was heard on the evening of the 17th of April at Glenageary, Co. Dublin, and subsequent evenings.—R. W. SCULLY and H. J. SYNOTT, Dublin.

E. W. writes to the *Irish Times* of April 12th, that Swallows have been seen in the neighbourhood of Leixlip several times during the preceding few days.

H. RICHARDSON writing to the *Irish Times* on April 7th, says that Sand-Martins have arrived at Sletty, Queen's County.

T. J. D. writes to *Land and Water* for March 17th, that on March 8th a Cuckoo was seen in the neighbourhood of Waterville. The bird was observed by a number of persons.

MAMMALS.

The Reddish-grey Bat (*Vespertilio Nattereri*, Kuhl) in Co. Galway.—I have the pleasure of recording the capture of a male specimen of this rare bat in the demesne of Lord Clonbrock near Ahascreegh. I was out in search of moths on the 9th April, and caught it with my net. Noticing that its characters differed from the common *Pipistrelle* I forwarded it to the Dublin Museum, thinking that it might be the Whiskered Bat. The chief characters which distinguish *V. Nattereri* are the fringe of bristles which clothe the margin of the membrane between the point of the tail and the calcaneum (or spur which projects from the heel of the hind foot to support this part of the membrane). The fur is light reddish brown, lighter than all the British species, except *Vespertilio murinus*. The head is considerably raised above the face line, and the muzzle, which projects forward and somewhat upwards, is broad and prominent at the corners over the nostrils. The ears are longer than those of the *Pipistrelle*, and extend $\frac{1}{6}$ -inch at least beyond the end of the nose, having a vertical outer lobe near the end of the outer margin well developed. The tragus (or inner ear membrane, so well known in the Long-eared Bat), is very long, narrow, and sub-acutely pointed. The measurement of this male exceeds that given of a female in the British Museum Catalogue, being of the head and body 2 inches, but the tail is shorter, namely 1.5 inch. In England this species has a wide but local distribution, and has occurred in church roofs as well as in a chalk pit reached by an underground shaft 70 feet deep. They are very social in their habits, and roost in masses clinging together for warmth. They are also found in Central Europe and on the Adriatic and Mediterranean littoral (Bell).

Specimens have been taken at the Scalp, Co. Wicklow, in 1845, and in Co. Longford by Mr. G. E. Dobson (Brit. Mus. Cat.); in Co. Donegal by Mr. H. C. Hart, and at Dundalk by Mr. Jameson, whose notice of Irish bats has recently appeared in this journal.—WM. F. DE V. KANE, Drumreask, Monaghan.

The Marten in Ireland.—In the *Zoologist* for April, Messrs. G. E. H. Barrett-Hamilton, Robert Patterson, and J. J. Dowling supplement Mr. Harting's paper, in the previous month's issue, by notes of the occurrence of this animal in various parts of Ireland. Cavan, Louth, Limerick, and Roscommon appear to be the only Irish counties from which the Marten has not been recorded; but the list of counties in which the Marten is now extinct would undoubtedly be a much larger one.

GEOLOGY.

Geological Photographs.—We have received from Mr. R. Welch, Lonsdale-street, Belfast, a copy of his Catalogue of Irish Geological Photographs, a well printed pamphlet of 24 pages octavo. We welcome this catalogue as being a useful and original piece of work, and one which will be a boon to the student of Irish geology. Following the negative-numbers and titles of the photographs, are terse descriptions of the geological features exemplified in each, contributed by Professor Grenville Cole, F.G.S. Even in the absence of the photographs, these descriptive notes form interesting reading; and when taken in conjunction with the views, which are all up to Mr. Welch's well-known high standard of merit, the result is a production of much educational value. The subjects catalogued include peat-bogs, sands and gravels, Boulder clays, Cretaceous, Triassic, Carboniferous, Devonian, Silurian, and Cambrian strata; dykes, lava-flows, faults, and foldings. A large series is quoted illustrating denudation and erosion, and a second large series exemplifies fully the many interesting features of the basaltic plateau of Antrim.

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THE HIGH AND LOW-LEVEL SHELLY DRIFTS AROUND DUBLIN AND BRAY.

BY T. MELLARD READE, F.G.S.

THERE has of late years been a great revival of interest in Glacial Geology, more especially as relates to our own country. The high-level shelly gravels have given enthusiastic glacialists both joy and tribulation. Joy where the facts fit in with one's favourite theories, and tribulation when we discover further and unthought-of difficulties in applying the pet hypothesis of the hour. Personally, my endeavour has been to preserve a philosophic calm befitting so difficult a subject, but whether it has been successful or not must be left to others to decide.

Very few geologists are aware of the great development of shelly drift extending from sea-level up to 1200 feet which exists in the neighbourhood of Dublin and Bray. Before I examined the district under the experienced guidance of the Rev. Maxwell Close, I was under the impression that all I should see at the higher levels would be sporadic patches of shelly sands and gravels. I was agreeably disappointed; for the continuity, extent, and bulk of the shelly deposits exceed any of those in the classic regions of England and Wales. These I had previously explored in a rather careful way, but the deposits in Ireland supplement and help to explain the better known deposits in England and Wales in some most important respects.

All that one can pretend to give in these few pages is a general conception of the high-level shelly drift, and its intermediate relations with the drift of the coastal margin; and to do this, the natural way is to describe the coastal deposits, and trace them up to the higher levels.

Beginning at the Hill of Howth, shelly sands and gravels are seen in considerable development from Howth to the Bailey Lighthouse. They extend to 300 feet above the sea-

level, and where the sections are best exposed, reminded me very much of the sands and gravels of Gloppa, near Oswestry, which occur 1100 feet above the sea-level. There is little doubt that at one time the whole of the present sea-cliffs of the Hill of Howth were buried in drift, which has been cut away by the action of the sea, leaving the drift in many places merely hanging onto a steep surface of Cambrian rocks at the top of the cliffs. Bailey Lighthouse is built upon a spur or promontory of drift based on Cambrian cliffs.

Let us now cross over Dublin Bay, and examine the splendid sections of sands, gravels, and boulder clay exposed in the cliffs of Killiney Bay. Here we may see and study a typical section of glacial-marine drift, and observe the curious way in which the several beds of sand, gravel, sand and gravel, gravel and boulders, and boulder clay, behave towards each other. In one place we see arched, in another horizontal stratification, elsewhere contorted bands occur, truncation of beds, lamination, and oblique bedding. Indeed, nothing but a careful section can give one any adequate conception of the nature of this drift. Marine shells, or shell-fragments, occur in all of these beds, excepting the horizontally bedded fine gravels near Ballybrack Station. We did not make any attempt to get a complete collection of shells, which would have taken a much longer time than was at our disposal, being principally occupied with drawing the section. We did, however, pick up *Astarte arctica*, *A. sulcata*, *Cardium edule*, *Mya truncata*, *Tellina balthica*, and other indeterminable fragments. These are among the commonest shells in glacial deposits.¹ This character of drift continues south along the coast, as far as the River Bray; but on nearing that river it is underlain by a hard, brown clay, which I call basement clay, with a pretty decided line of demarcation between them. The drift gravels, so far as described, consist, to the largest extent, of Carboniferous limestone, occurring as gravel, pebbles, and boulders—mixed with granite and Cambrian schists, and some flints, chert, &c. The basement clay, though containing these rocks, is much more largely made up of Cambrian schists, slates, and quartzites. These boulders can be seen

¹ Mr. Lloyd Praeger, in the present volume of this Journal, pp. 17, 18, gives a careful provisional list of the shells of the Killiney drift, naming the beds from which they are taken,

embedded *in situ* on the shore, so that their axial direction may be noted, when it appears that they are preponderatingly in a N.W. direction. The stones are often well striated, much more so than in the overlying drift, and the striæ point in the same north-westerly direction. The stones are not necessarily horizontal, but lie at varying inclinations. Shells occur in this clay. I took out a perfect *Turritella* and a fragment of a very large *Cardium*, having a highly porcellaneous glaze on the interior surface. Another curious feature is the presence of vertically-inclined beds of laminated clay, which penetrate both the basement clay and the drift overlying it. Vertical dykes of gravel also occur.

A microscopic examination of the materials of this basement clay showed that the larger grains were largely Cambrian grit and schist, mica schist, and vein quartz, black chert, black and grey limestone, quartzite, crystalline quartz, and a few exceedingly rounded minute pebbles of black limestone. In the smaller grains many well rounded and polished grains of quartz occurred, and many flakes of mica.

As illustrating this phase of the glacial deposits it will be well to pay a visit to the Bog Hall brickworks about one mile from Bray on the road to Kilmacanoge. The level of the deposit is, roughly speaking, about 200 feet above the sea-level. The clay of which the bricks are made is of a rusty brown colour, and there appeared at first sight to be an unusual proportion of Cambrian rocks among those which had been thrown out. A further examination showed that there were some large limestone boulders about, but these may have come from the upper part of the clay. The clay seemed to be separable into two beds. In the lower bed an excavation had been recently made, and all the rocks thrown out appeared to be Cambrian, Silurian, or granite. One block of Cambrian measured 3 feet 6 inches long, and was well-planed and striated. A block of quartzite conglomerate occurred, over 1 foot 8 inches long, and one granite boulder measured 3 feet in diameter. A mechanical analysis of a specimen taken of this clay told the same story, the larger residual fragments, after washing and riddling, consisting of Cambrian rocks, schists, grains of quartzite, quartz veins, &c. The smaller grains had a larger proportion of quartz grains from the disintegration of granite, but otherwise they were of the same character. What one would have hardly expected to find present in this

clay were highly polished and rounded quartz grains. Flakes of mica were common. All the residual material was non-calcareous and did not effervesce with acid.

On and beyond Bray Head to the southward, sands and gravels and boulder-clay of the shelly type continued. At the south side of Bray Head I picked up quite a number of pebbles of red Triassic sandstone which corresponded precisely with the New Red Sandstone at Newtownards in County Down.

We have now rapidly traversed the coastal deposits of drift with a glance at a bed of clay a little inland. It remains to follow the drift of the valleys to the high-level developments on the Three Rock Mountain and elsewhere, but before doing so let us ascend the Great Sugar-Loaf. Starting from the top of the Glen of the Downs we note the presence of granite boulders lying on the side of the mountain between the level of 1,000 and 1,100 feet. These, it is needless to say, are erratics, as the Great Sugar-Loaf is of Cambrian quartzite. At about 1,100 feet the talus of the quartzite cone forming the summit begins, so that if any granite boulders ever reached a higher level they would most likely get covered up by the talus material. On the descent to the north-eastward the talus reaches a lower level, and at 880 feet above the sea a granite boulder was observed amongst it. Also at 550 feet one 3 feet in diameter occurred, while still lower down a much larger one almost entirely embedded in the ground was to be seen.

On the main road from the Glen of the Downs to Bray some very interesting gravel pits in esker-like mounds are to be seen, consisting largely of limestone gravel and boulders intermixed with granite. Shell fragments were found in all of them, but mostly in a very chalky and carious condition, in some cases being a mere net-work. They are mostly indeterminate excepting *Turritella* and *Cardium*. These mounds show oblique bedding of sand and gravel, in one case capped with boulder-clay. Some of the fine gravel is so clean that it runs like shot on being disturbed. We will now turn our attention to the valleys, and first of all that of Glennasmole enlists our sympathies, due to some extent to the splendid conditions of weather under which it was explored. Again we were indebted to Mr. Close's guidance and to Mr. Praeger's help.

A drive by the banks of the River Dodder showed a fine series of river terraces formed out of the glacial drift. At a

level of about 860 feet above the sea a very careful search in a large gravel-pit yielded a few glacial shell fragments of the ordinary type, but indeterminable; most were chalky and carious. A microscopic examination after riddling disclosed the presence of a few shelly grains as also much granitic debris. There is a great development of drift in this valley which is best seen from the opposite side near the reservoir of the Rathmines Waterworks. It is buff-coloured, clayey, to the greatest extent limestone, but also containing granite, Ordovician grit, and feldstone. Some of the limestone pebbles are striated. It is quite remarkable how this limestone gravel has been swept up the valley and rests on the granite forming the bottom rock. The drive back on the opposite side of the valley—after a pleasant lunch in a sunny hayfield and admiring glances at Kippure rising majestically at the head of Glennasmole—showed plainly that, though the drift is still in great force, much of it has been removed by denudation.

We may now with advantage devote a little attention to Glencullen. This valley drains to the south-east, or in the opposite direction to that of the upper part of Glennasmole. In it is to be seen a grand development of drift, which has already been described in this Journal by Professor Grenville Cole, who accompanies his observations with a good photograph.¹ This drift is of a very stony nature, so much so that I had to get a specimen I wanted out with a chisel. It is mostly full of Carboniferous limestone pebbles of a dark blue colour; some well worn, and many well striated—some of the boulders intensely so. There is also a considerable proportion of Wicklow granite, some mica schist, and many flakes of mica; also boulders of red conglomerate from the base of the Carboniferous. The granite increases in proportional quantity as we ascend the glen, until at Glencullen Bridge it becomes predominant. In many places great blocks of gravel are cemented together into a natural concrete by the deposit of carbonate of lime. Further south, below Enniskerry, stratified yellow sands are seen on the right bank of the Cookstown River, probably 100 feet thick. In these sands are thin beds of crushed granite and occasional thin beds of limestone gravel.

(TO BE CONCLUDED).

¹ "County Dublin, Past and Present." *I. N.*, 1892, p. 92

INSECTS COLLECTED BY THE ROYAL IRISH
ACADEMY FLORA AND FAUNA COMMITTEE,
1893.

BY REV. W. F. JOHNSON, M.A., F.E.S., J. N. HALBERT, AND
GEORGE H. CARPENTER, B.SC.

COLEOPTERA.

(Continued from page 105.)

HYDROPHILIDÆ.

- Hydroblus fuscipes**, L.—Coolmore.
Anacæna globulus, Payk.—Lough Oughter, in drains. Slieve Glah,
in a pool.
Philhydrus melanocephalus, Ol.—In a pool on Slieve Glah.
P. coarctatus, Gredt.—Coolmore.
Laccobius minutus, L.—Coolmore.
Limnebius truncatellus, Thoms.—Coolmore.
Helophorus nubilus, F.—Coolmore.
H. aquaticus, L.—Berehaven.
H. brevipalpis, Bedel.—Coolmore. Slieve Glah, in a pool.
Cyclonotum orbiculare, F.—Coolmore.
Sphæridium scarabæoides, F.—Coolmore. Ballyhaise.
Cercyon littoralis, Gyll.—Coolmore. Greenore.
C. hæmorrhoidalis, Herbst.—Coolmore. Carlingford.
C. flavipes, F.—Coolmore.
C. melanocephalus, L.—Coolmore.
C. quisquilius, L.—Coolmore.
C. analls, Payk.—Coolmore.
Megasternum boletophagum, Marsh.—Coolmore.

STAPHYLINIDÆ.

***Aleochara lata**, Grav.—Coolmore, in dead bird. This is a southern species in England; its occurrence in Co. Donegal is therefore remarkable.

- A. cuniculorum**, Kr.—Coolmore.
A. lanuginosa, Grav.—Coolmore.
A. mœsta, Grav.—Coolmore.
A. grisea, Kr.—Coolmore.
Oxypoda opaca, Grav.—Coolmore.
Astilbus canaliculatus, F.—Coolmore.
Homalota vicina, Steph.—Coolmore.
H. atramentaria, Gyll.—Coolmore.
***H. longicornis**, Grav.—Coolmore.
Tachyusa atra, Grav.—Coolmore.
Conosoma lividum, Er.—Near Cavan, common.
Tachyporus obtusus, L.—Ballyhaise.
var. **nitidicollis**, Steph.—Cavan, very common.
T. chrysomellinus, L.—Coolmore. Dundalk. Cavan.
T. humerosus, Er.—Cavan.
***T. tersus**, Er.—Ballyhaise.
T. hypnorum, F.—Coolmore. Cavan.
Tachinus rufipes, L.—Coolmore. Fathom.
T. marginellus, F.—Ballyhaise.

Quedius mesomelinus, Marsh.—Oak Wood, Ballyhaise. It has occurred as yet in only two other localities in Ireland, viz.—Armagh and Santry, Co. Dublin.

Q. cinctus, Payk.—Shores of Lough Oughter.

Q. fuliginosus, Grav.—Fathom. Cavan, common. Killarney.

Q. tristis, Grav.—Coolmore.

Q. molochinus, Grav.—Coolmore. Slieve Glah, under stones on the summit.

Q. rufipes, Grav.—Coolmore.

Q. semiæneus, Steph.—Coolmore.

Creophilus maxillosus , L.	{	Coolmore, both type and variety were very plentiful in carrion. The var. seems to be regarded as a northern form, although taken by Haliday, near Dingle. ¹
var. ciliaris , Steph.		

Staphyllinus pubescens, De G.—Coolmore.

S. erythropterus, L.—Coolmore.

S. cæsareus, Ceder.—Coolmore. Shores of Lough Oughter, under logs. Dursley. It does not appear to have been previously recorded from the south-west, which is remarkable seeing it is so conspicuous and common an insect.

Ocypus olens, Müll.—Coolmore. Fathom, Shores of Lough Oughter.

O. cupreus, Rossi—Coolmore. Ballyhaise.

O. morio, Grav.—Coolmore.

Philonthus splendens, F.—Coolmore, in carrion.

P. laminatus, Creutz.—Coolmore.

P. æneus, Rossi—Coolmore.

P. proximus, Kr.—Coolmore.

P. addendus, Sharp.—Coolmore. Ballyhaise.

P. carbonarius, Gyll.—Oak wood, Ballyhaise.

P. politus, F.—Coolmore.

***P. lucens**, Er.—One specimen on shore of Lough Oughter. A rare species in Great Britain (where it has a northern and western range), and a nice addition to the Irish fauna.²

P. varius, Gyll.—Ballyhaise. Dursley.

P. marginatus, F.—Coolmore.

P. cephalotes, Grav.—Coolmore.

P. flmetarius, Grav.—Coolmore. Ballyhaise.

P. sanguinolentus, Grav.—Coolmore. Ballyhaise.

P. varians, Payk.—Coolmore.

***P. fumaris**, Grav.—Lough Oughter shore. New to Ireland. Locally distributed over England and Wales, but not recorded from Scotland.

P. trossius, Nord.—Coolmore. Cavan, common.

P. puella, Nord.—Oak Wood, Ballyhaise.

Cafius xantholoma, Grav.—Beach at Greenore.

¹ We find that *Carabus catenulatus* and *C. clathratus* given in last month's issue as new to the S. W. of Ireland, were also obtained near Dingle by Haliday (*Nat. Hist. Rev.* vol. ii.)—Eds.

It will be seen on p. 134, that Mr. W. E. Sharp has found this species in flood-rubbish from Armagh.—Eds.

- Xantholinus glabratus**, Grav.—Coolmore.
X. punctulatus, Payk.—Cavan, common.
X. tricolor, F.—Coolmore; hitherto only recorded from the east coast.
 * **X. distans**, Kr.—Coolmore. Banks of R. Erne above Ballyshannon. It has also occurred at Bundoran. It is a northern and alpine insect.
X. linearis, Ol.—Coolmore, Cavan, common.
Othius fulvipennis, F.—Ballyhaise, Oak wood.
O. melanocephalus, Grav.—Ballyhaise, Oak wood.
Lathrobium elongatum, L.—Shores of Lough Oughter.
L. brunnipes, F.—Coolmore. Cavan, common. Killarney.
 * **L. pallidum**, Nord.—Coolmore. Another south of England species now recorded as Irish for the first time, from a north-western locality.
Stenus guttula, Mull.—Coolmore, plentiful on edges of little streams.
S. bimaculatus, Gyll.—Farnham demesne.
S. juno, F.—Farnham demesne.
S. carbonarius, Gyll.—Shores of Lough Oughter; only other Irish locality is Killarney.
S. impressus, Germ.—Carlingford. Cavan.
S. pallitarsis, Steph.—Cultragh Lough.
S. bifoveolatus, Gyll.—Near Cavan.
S. nitidiusculus, Steph.—Cavan, common.
S. picipes, Steph.—Ballyhaise, &c., common.
S. similis, Herbst.—Cavan, common. Coolmore.
S. tarsalis, Ljun.—Lough Oughter shore.
S. latifrons, Er.—Coolmore. Cavan.
Bledius arenarius, Payk.—Coolmore, very numerous in the sandy beach.
 * **B. fuscipes**, Rye.—Coolmore, rare. New to Ireland; a northern insect in Great Britain.
Platystethus arenarius, Fourc.—Coolmore. Cavan, common.
Oxytelus rugosus, Grav.—Coolmore.
O. nitidulus, Grav.—Cultragh Lough.
O. tetracarlinatus, Block.—Coolmore, plentiful.
Haploderus cœlatus, Grav.—Near Cavan.
Lesteva longelytrata, Goeze.—Coolmore.
Lathrimœum unicolor, Steph.—Cavan, common.
Omalium riparium, Thoms.—Coolmore.
Anthobium ophthalmicum, Payk.—Narrow Water.

(TO BE CONTINUED.)

POTAMOGETON UNDULATUS, WOLFGANG, IN IRELAND.

BY ARTHUR BENNETT, F.L.S.

RECENTLY I have gone through a good many gatherings of *Potamogeton perfoliatus*, L., &c., with a view to see if any could be referred to *P. undulatus*, Wolfgang; attention to which has been called by Mr. Fryer in the *Journal of Botany* for 1891 (p. 289, t. 318), and in the *Annals of Scottish Natural*

History, 1892 (p. 115). I find that a specimen from "Sixmile River, Co. Antrim, 5. 6. 82 (leg.) S. A. Stewart," belongs to it, and seems nearest to the var. *Jacksoni*, Fryer *l.c.* p. 290 (*P. perfoliatus*, L., var. *Jacksoni*, F. A. Lees of the London Catalogue). Whether any other Irish specimens are extant I cannot say, as I have not had any opportunity of looking through the British Museum Herbarium or Kew Herbarium for that purpose.

In Scotland *P. undulatus* has been gathered in Stirling!; in England in Leicestershire!, Yorkshire!, Cheshire!, Salop!, Anglesea!, and perhaps Surrey?; and it will no doubt be found elsewhere if looked for, or searched for among herbaria. For a very full description, and remarks on affinities, I must refer to Mr. Fryer's paper in the *Journal of Botany*.

What is *P. undulatus*, Wolfgang? It may be well to give some of the opinions respecting it. Where originally described in Roemer and Schultes' "Sys. Veg.," Mantissa 3, p. 361 (1827), it was considered a sub-species or variety of *P. crispus*. Ledebour ("Flora Rossica," vol. iv. p. 29 (1853)), seemed to think the same; as also Eichwald (Nat. Shizz. Lith., &c. (1830)); and as lately as 1890 it appears in Dr. Richter's "Plantæ Europææ" (p. 14), simply as a synonym of *P. crispus*. In the same year, in Nyman's "Conspectus Floræ Europææ," Suppl. ii., p. 287, it is referred to *P. decipiens* on the authority of Schmalhausen. Dr. Tiselius (*in litt.*) was inclined to refer it to *P. prolongus*; and by myself the var. *Jacksoni* was considered a form of *perfoliatus*, while Prof. Babington thought it might be a *nitens* form. This is a sufficiently wide reference for certain, taking all the above. Mr. Fryer, by cultivating the form *Cooperi*, and by a close and careful observance of its various states, coupled with an examination of an original specimen of Wolfgang's, came to the conclusion that it is an hybrid between *P. crispus* L., and *P. perfoliatus* L., and short of producing it by actual experiment, it seems hard to dispute his conclusion.

The author of the plant, Wolfgang, was a close student of the genus *Potamogeton*, and drew up a Monograph of it in MS. with descriptions and drawings, and it is to that Monograph that the numbers given to Roemer and Schultes by his friend Besser apply. This manuscript is preserved in the Library of the Moscow Society of Naturalists, according to Trautvetter ("Floræ Rossicæ Fontes," p. 329 (1880)).

P. undulatus may be known from *P. perfoliatus* by its compressed stem; this is easily seen when the plant is fresh, but is lost when dried; also by its leaves only half clasping the stem (not wholly, and cordate, as in *perfoliatus*). Usually the nerves are much fewer than in *perfoliatus*; the early growth is also much like *crispus* in facies; but as in all hybrids, it varies much, sometimes inclining to one supposed parent, sometimes to the other. From *P. crispus* it may be known by the nearly entire leaves (the apex of which has minute persistent spines) not serrated as in *crispus*. Usually the mature upper leaves are much broader than generally is the case in *crispus*; but I have seen a specimen of true *crispus* with leaves nearly as broad as some of the *undulatus* forms.

AMERICAN BIRD-VISITORS TO IRELAND.

BY W. E. PRAEGER, KEOKUK, IOWA.

VII.—THE WHITE JER-FALCON (*Falco islandus*, A.O.U. Checklist; *F. candicans*, most authors).

A GLANCE over what has been written on the Jer-Falcon in our systematic works, will convince the reader that in ornithology also the old saying is true, "Doctors differ." No two authorities are quite agreed as to how many species of the great falcon of the Arctic regions ought to be recognised. The Jer-Falcons from various countries differ greatly from each other, yet for the most part they intergrade perfectly; and the discussions of the savants, after all, only prove that such things as species do not really exist in nature, but are artificial groups, adopted for our own convenience, or in deference to the opinion of our predecessors.

The Jer-Falcons inhabit the Arctic and Sub-Arctic regions. They are true Falcons, possessing the pointed wing and toothed bill of this genus, of which they are the largest representatives. A length of from 20 to 24 inches distinguishes them from all their smaller allies. As is often the case in Arctic birds, the tarsus is more extensively feathered than among the more southerly species of the same genus. There should be no trouble telling a Jer-Falcon at sight irrespective of its colour; but when we come to that characteristic, on which the various species or sub-species are based, the question becomes very complicated, and need not be entered on in any detail here. It will be sufficient to say that in Labrador

occurs the so-called "Black" Jer-Falcon, of a nearly uniform dark brown. Around Baffin's Bay the bird is nearly pure white, while in Southern Alaska, the Fur Countries, Southern Greenland, Iceland, and Norway, various forms occur between these two extremes.

The White Jer-Falcon, with which we are now concerned, has occurred ten or twelve times in Ireland, eight having been taken in the winter of 1883-4. They have usually been found along the west coast, which in winter almost rivals their distant home in stormy desolation and rugged grandeur.

We call this an American bird, yet very few Americans have ever seen it alive; indeed, I do not know if it has ever been noticed in the United States. Its centre of distribution is the northern shores of Baffin's Bay and Smith's Sound, and it probably occurs throughout the archipelago to the westward. As far north as man has penetrated this Falcon has been found. In that mysterious land of ice and snow, that has so long defied the explorer's skill and courage, and has as yet given up but a part of its secrets to the so-called lord of creation, the White Jer-Falcon has its home. Among the eternal snows in which it lives, its white dress is highly protective—not to protect it from enemies, for such a bird need fear none, but, as in the case of the bears, foxes, and owls of the same region, to aid it in the pursuit of its prey. The bleak hillsides furnish it many a meal of Ptarmigan or Arctic Hare, the cliffs are visited in pursuit of the Auks and Puffins that breed there in myriads, and even the tyrant Gulls are not safe from its attacks. One has been seen carrying off a Kittiwake Gull in each foot.

As the White Jer-Falcon lives above the limits of the forest-growth, it always nests on the ground, though some of the more southern races build in trees. The nest is roughly built of sticks, grass, and moss, and is placed most frequently on a ledge of some high cliff. The eggs are creamy white, very thickly marked with shades of reddish brown.

In the days of falconry the white bird was the most highly valued of all hawks for the chase, and fabulous sums were paid for trained birds of this species; indeed, their possession was almost confined to royalty. But this most interesting subject cannot be entered on here, and we must leave the reader to pursue elsewhere his studies of this fascinating chapter in the history of the White Jer-Falcon.

THE PLANTS OF WESTMEATH.

BY H. C. LEVINGE, D.L.

(Concluded from page 100).

†**Verbascum thapsus**, L.—Knock Drin, several times seen in garden ground.

Scrophularia aquatica, L.—(VII.) Clondaliever, rare in the county.

Linaria vulgaris, Mill.—Fields near L. Sheelin, Miss E. Reynell.

Veronica hederifolia, L.—Knock Drin! Shore of Killinure Lough, B. & V.

‡**V. persica**, Poir.—Knock Drin, not previously definitely reported from the county; but placed in District 7 by B. & V.

V. montana, L.—Knock Drin old wood! Donore! also at Hare Island, L. Ree, B. & V.

V. scutellata, L.—Drinmore, not common in the county.

Euphrasia officinalis, L. var. **gracilis**, Fr.—Bog banks at entrance of R. Inny into L. Derevaragh, H. & J. Groves!

Melampyrum pratense, L.—Knock Eyon and Lisclogher Bog.

Lathræa squamaria, L.—Belvedere Woods, not previously recorded from the county.

Utricularia vulgaris, L.—Quarry Bog, and Scraw bog, Loughans-town.

U. minor, L.—Quarry Bog! and Coosan Lough, B. & V

***Mentha viridis**, L.—(VII.) Naturalized at edge of R. Gaine, below the old mill at Knock Drin.

Lycopus europæus, L.—Shore of L. Derevaragh at Kiltoom, rare! not previously definitely recorded from this county; but found in District 7, near L. Ree, B. & V.

Origanum vulgare, L.—Railway banks between Athlone and Moate, Reynella, Miss E. Reynell.

Scutellaria galericulata, L.—N.W. end of L. Owel, locally plentiful.

Lamium album, L.—Knock Drin.

L. Galeobdolon, Crantz — Woods at L. Ennel, near Mullingar F. J. F. Not seen by me, though several times searched for.

Ballota nigra, L.—Near Turin, Miss E. Reynell.

Teucrium Scordium, L.—South end of L. Ree, J. & H. Groves, also B. & V.

Littorella lacustris, L.—Margins of Loughs Owel, Ennel, Derevaragh, and Drin! also L. Ree, B. & V.

Chenopodium album, L.—Knock Drin; not previously recorded from the county.

***C. Bonus-Henricus**, L.—Roadside, between Ballinafid and Multifarnham.

Atriplex angustifolia, Sm.—Knock Drin; not previously recorded from the county.

Rumex hydrolapathum, Huds.—N.W. end of L. Owel. Not previously definitely recorded from the county; but placed in District 7 by B. & V., who found it near L. Ree.

Parietaria officinalis, L.—Walls of Mullingar Jail.

Salix pentandra, L.—(VII.) Bog of Lynn, near Mullingar, in several places.

†**S. fragilis**, L.—(VII.) Quarry Bog, near road.

†**S. alba**, L.—(VII.) Knock Drin.

†**S. purpurea**, L.—(VII.) Knock Drin.

S. aurita, L.— } Knock Drin; not previously definitely recorded
S. caprea, L.— } from the county.

S. repens, L. var. **genuina**, Auct.—(VII.) Lisclogher Bog.

var. **prostrata**, Sm.—(VII.) Scraw Bog, Loughanstown.

Empetrum nigrum, L.—Lisclogher Bog, 270 feet above sea level, not previously recorded from the county. The plant is locally plentiful on this flat bog—Mr. Dowd reports it from “the tops of mountains four miles from Parsonstown,” King’s County (District 7.)

Ceratophyllum demersum, L.—(VII.) L. Derevaragh, plentiful in the part of the lake known as “the pond of Donore,” but not fruiting, probably owing to the water being too deep where it grows.

***Elodea canadensis**, Mich.—L. Ennel, L. Derevaragh, &c.

Hydrocharis Morsus-Ranæ, L. — Bog of Lynn, “Scraw bog,” Ballynegall, and road ditch, Robinstown Levinge.

Neottia Nidus-avis, Rich.—Knock Drin woods in two places; not previously reported from the County Westmeath.

Epipactis latifolia, Auct.—Hare Island, L. Ree, B. & V.

E. palustris, Crantz.—One or two places round Killinure L., and abundant in meadows near L. Ree, B. & V.

Cephalanthera ensifolia, Rich.—Hare Island, L. Ree, Miss Levinge, also B. & V.

Orchis pyramidalis, L.—Knock Drin, plentiful.

O. Morio, L.—Kilmaglish and Knock Eyon, in old pastures.

O. latifolia, L.—Shore of L. Derevaragh.

Ophrys apifera, Huds.—Tudenham Park, Hon. Mrs. Tottenham! and Knock Drin! rare.

Habenaria conopsea, Benth.—Knock Drin and Ballynegall.

H. viridis, R. Br.—Bog of Lynn and “Scraw Bog,” Loughanstown—rare.

H. bifolia, R. Br.—Bog of Lynn.

H. chloroleuca, Ridley—Curraghbrack, Knock Drin! and E. side of Rinardo Bay, L. Ree, B. & V.

***Polygonatum multiflorum**, All.—(VII.) Donore—naturalized and well established.

Juncus supinus, Mæench., var. **fluitans**, Fr.—Quarry bog, in holes; leaves wider than in the mountain form.

J. glaucus, Ehrh.—Plentiful about Knock Drin! not previously definitely recorded from this county, but said to be common near L. Ree by B. & V., who have referred it to District 7.

Juncus obtusiflorus, Ehrh.—(VII.) Scraw bog, Loughanstown, Robinstown, Tyrrell, and near the bank of the canal supply at Levington.

Luzula pilosa, Wittd.—(VII.) Knock Drin wood, Donore, and Crooked wood.

† **Sparganium simplex**, Huds. — Gartlandstown! and in the Shannon near Athlone, B. & V.

S. minimum, Fr.—Quarry Bog! and near Coosan L., B. & V.

Lemna trisulca, L.—Kilmaglish! "Scraw bog"! and near Doonis Lough, B. & V.

L. polyrrhiza, L.—Pond at roadside, near Portnashangan Rectory! Belvedere L., D. M., and in a drain near Doonis L., B. & V.; not common.

Sagittaria sagittifolia, L.—L. Derevaragh, and River Inny; plentiful.

Potamogeton plantagineus, De Croz.—In holes, "Scraw Bog" Loughanstown.

P. rufescens, Schrad.—In a drain, near Ballykeeran, B. & V.

P. heterophyllus, Schreb.—L. Owel; not previously definitely reported from Co. Westmeath, but referred to Dist. 7 by B. & V., who state that it is common near L. Ree.

P. nitens, Web.—(VII.) L. Derevaragh.

P. lucens, L.—L. Derevaragh, L. Owel, and L. Ennel.

var. **acuminatus**, Schum.—L. Derevaragh, near mouth of R. Inny.

P. Zizii, Roth.—L. Drin! L. Derevaragh! and plentiful in L. Ree, B. & V.

P. prælongus, Wulf.—(VII.) L. Owel.

P. perfoliatus, L.—Brittas L.! Knock Drin! and L. Derevaragh, and common in L. Ree, B. & V.

P. pusillus, L.—Stream from L. Drin! and frequent in drains near L. Ree, B. & V.

P. pectinatus, L.—L. Ennel, and Ballynegall Lakes.

P. flabellatus, Bal.—In the Shannon, near Athlone, B. & V.

P. filiformis, Nolte.—Frequent in L. Ree, B. & V.

Scirpus pauciflorus, Lightf.—Shores of L. Drin, and of L. Ennel! and common in L. Ree, B. & V.

S. lacustris, L.—In nearly all the lakes; plentiful; but not previously reported from the Co. Westmeath.

S. setaceus, L.—(VII.) Knock Drin; not common.

Cladium germanicum, Schrad.—Plentiful on the margin of L. Drin! L. Owel, &c., and L. Ree, B. & V.

Carex dioica, L.—Lisclogher Bog, "Scraw bog," Loughanstown.

C. pulicaris, L.—Drinmore, and elsewhere, plentiful! also common in the neighbourhood of L. Ree, B. & V.; but not previously definitely reported from Co. Westmeath.

C. disticha, Huds.—Quarry Bog, and edge of L. Derevaragh at Kiltoom! also banks of the Inny in Co. Longford, B. & V., but not previously definitely reported from the Co. Westmeath.

C. teretiuscula, Good.—"Scraw Bog," Loughanstown, and Bog of Lynn; frequent.

C. paradoxa, Willd.—Ladestown, only a few plants left in the old locality. I have however lately found it in the bog of Lynn, and sparingly in the "Scraw bog," Loughanstown.

C. remota, L.—(VII.) Knock Drin; not a common plant.

C. ovalis, Good.—Knock Drin, and Drinmore! and frequently near L. Ree, B. & V.; but not previously definitely reported from Westmeath.

C. stricta, Good.—Quarry bog, and elsewhere.

C. limosa, L.—Lisclogher Bog, and Scraw bog, Loughanstown.

C. pilulifera, L.—Edge of L. Drin! Shefin Hill, Miss Levinge, and "frequent in suitable places" near L. Ree, B. & V., but not before definitely reported from Westmeath.

C. binervis, Sm.—Edge of L. Drin, not common.

C. fulva, Good., var. **Hornschuchiana**, Hoppe.—Knock Drin and Drinmore, not uncommon.

C. Oederi, Ehrh.—(VII.) Shores of L. Ennel.

C. filiformis, L.—“Scraw bog,” Loughanstown, very plentiful locally.

C. paludosa, Good.—Shores of L. Derevaragh, and Quarry Bog.

C. vesicaria, L.—Near Athlone, B. & V.

Phalaris arundinacea, L.—Knock Drin, abundant! not previously definitely reported from the county, though mentioned as common near L. Ree by B. & V.

Alopecurus geniculatus, L.— } Kilmaglish! Drinmore! Both
are reported as common near
L. Ree; but neither have been
before definitely recorded from
the Co. Westmeath.

A. pratensis, L.—

Millium effusum, L.—(VII.) Knock Ross with *Festuca sylvatica*, rare.

Phleum pratense, L.—Knock Drin, and generally plentiful; but not before recorded from the county.

Deschampsia flexuosa, Trin.—(VII.) Quarry, Knock Drin.

Holcus mollis, L.—Woods and edge of Brittas L., Knock Drin! not uncommon near L. Ree, B. & V.; not definitely reported before from this county.

Trisetum flavescens, Beauv.—Knock Drin—same remarks as above.

Avena pubescens, Huds.—Plentiful; but not noted in the *Cyb. Hyb.* as from this county.

***A. strigosa**, Schreb.—(VII.) Knock Drin, in cultivated fields.

Arrhenatherum avenaceum, Beauv., and var. **nodosum**, Reichb.—Knock Drin. The variety is perhaps the more common of the two.

Sieglingia decumbens, Bernh.—Drinmore, not common.

Catabrosa aquatica, Beauv.—Drinmore, in ditches! frequent near L. Ree, B. & V., but not before definitely reported from Westmeath.

Melica uniflora, Retz.—Knock Ross and Knock Eyon, locally plentiful; not previously reported from this county.

Poa nemoralis, L.—(VII.) Tops of old walls at Knock Drin, thoroughly established, if not indigenous.

Glyceria aquatica, Sm.—Canal at Mullingar.

Festuca rigida, Kunth.—(VII.) Killynnon, Edmonton, and near Mullingar.

F. sciuroides, Roth.—Knock Ross and Knock Drin; not before reported from Westmeath.

F. sylvatica, Vill.—(VII.) Knock Ross, rare.

F. arundinacea, Schreb.—Knock Drin, not before reported from Westmeath.

F. elatior, L. var. **lioliacea**, Huds.—Knock Ross. In this locality I found two forms—awned and unawned—which were submitted to the Watson Botanical Exchange Club. Both are alluded to in the report for 1892-93; the awned form is there called “forma *aristata*” on Hackel’s authority—fide A. Bennett.

†**Bromus erectus**, Huds.—(VII.) Knock Drin, in meadows, probably introduced with grass seed.

B. sterilis, L.—Athlone, Miss Levinge. B. & V. refer this to Dist. 7 in their paper on the plants of the shores of L. Ree, but do not state from what county it was obtained.

Bromus racemosus, L.—(VII.) Knock Drin.

‡ **Lolium temulentum**, L.—Knock Drin.

‡ **Agropyron caninum**, Beauv.—(VII.) Knock Ross, near the edge of the lake.

‡ **Hordeum pratense**, Huds.—(VII.) Knock Drin, only one large plant found.

‡ **Asplenium Adiantum-nigrum**, L.—Knock Ross and Knock Eyon.

Ceterach officinarum, Willd.—Walls of Poorhouse, near Mullingar.

Scolopendrium vulgare, L., var.—Knock Drin, sori on the upper and lower surfaces with anastomosing veins once found.

Cystopteris fragilis, Bernh.—On walls at Sonna, near Ballymore, F. J. F.

Lastrea Thelypteris, Presl. } Quarry and Lisclogher Bogs.
L. spinulosa, Presl. }

L. æmula, Brack.—Knock Body, growing very luxuriantly in the woods at the top of the hill above the lake.

Polypodium vulgare, L., var. **serratum**, Willd.—(VII.) Knock Ross.

Osmunda regalis, L.—Robinstown—Levinge, and Quarry Bogs.

Ophioglossum vulgatum, L.—Knock Drin, in meadows and pastures.

Botrychium Lunaria, Sw.—Knock Eyon, Miss E. Reynell, Shefin Hill, Miss Levinge.

Equisetum palustre, L.—Drimmore! and common near L. Ree; not before definitely reported from this county.

E. variegatum, Schleich, var. **Wilsoni** Newm.—Edge of L. Drin, and banks of canal near Killucan. Mr. A. Bennett remarks in the report of the Watson Exch. Club for 1892-3, regarding this plant, "The specimens have the stems not above half the thickness of the Killarney plants (*Wilsoni*), and are altogether a much slenderer plant. I should have named them *E. variegatum*, var. *majus*, Syme., that is, the same as the Royal Canal plant at Dublin.

Selaginella selaginoides, Gray.—Edge of L. Drin.

Chara fragilis, Desv.—Scraw bog, Loughanstown, and in all the lakes.

var. **barbata**, Grant — Scraw bog, Loughanstown, rare.

C. aspera, Willd.—Brittas L., Knock Drin, several forms.

C. polyacantha, A. Br.—Holes in Scraw bog, Loughanstown.

C. contraria, Kuetz.—Brittas L., and L. Owel; several forms, plentiful.

Chara tomentosa, L.—Plentiful, and growing to a very large size in Loughs Owel and Derevaragh; smaller in L. Ennel.

var.—In a drain N.W. corner of L. Owel, a well marked, but undescribed variety, less branched than the type, found by Mr. Groves!

C. hispida, L., var. **rudis**, A. Br.—L. Drin and Brittas L., locally common.

C. vulgaris, L.—L. Ennel, several forms.

Tolypella glomerata, Leonh.—L. Derevaragh, in the boat harbour, Kiltoom, and in the part of the lake known as the "Pond of Donore."

Nitella tenuissima, Kuetz.—Holes in the Scraw bog, Loughanstown. Found in this locality—for the first time in Ireland—by Mr. H. Groves!

N. opaca, Agardh.—L. Derevaragh (Pond of Donore), and Brittas L.

FEBRUARY COLEOPTERA FROM ARMAGH.

BY W. E. SHARP.

OF all the votaries of practical Biology it is probable that the Coleopterist feels least the limitations of locality and season. There is indeed not a day in the circle of the year, except during hard frost or deep snow, not a square foot from mountain top to lake bottom which may not afford him spoil or sport. There are coleoptera to be found in London bake-houses and beneath high-water mark on our shores, they exist everywhere and they are always in season. Any random handful of moss or haystack refuse, or vegetable litter, may provide the student, especially the beginner, with material for the work of weeks. How many species would the Lepidopterist or the Hymenopterist be likely to discover of their favourite groups alive and unimpaired in a tangled bunch of decayed herbage sent in a bag half across a kingdom?

Yet the writer, when our rural Cheshire postman delivered with evident relief a stout canvas bag, bearing the post-mark of Armagh, heavy with wet moss and indeed itself dripping with water, knew that in this unpleasantly moist parcel myriads of interesting, and probably some, to him, new Coleoptera were lurking, and rejoiced in the prospect of the beetles of an acre comprehended in a bushel. The time was immediately after a day or two's heavy February rain, the origin of the parcel the kindness of the Rev. W. F. Johnson of Armagh, who had gone to the trouble of collecting a quantity of the indefinite refuse which collects after a flood in a locality near that town, known as the Mullinures.

In an article on Armagh Coleoptera (*Irish Naturalist*, vol. 1., p. 15), the Rev. W. Johnson has already explained the nature of this ground, and given a list of some of its beetle inhabitants. It has however occurred to me that it might be interesting if I were to very shortly enumerate the actual species which were found in this mass of not more than seven or eight pounds of "flood refuse." My method of capture was to shake out the litter (in a common garden sieve, a few handfuls at a time), over a large white dish with steep sides. A moistened finger-tip transferred the beetles to a laurel bottle and their doom.

The appearance of this dish on the shaking out of one of these handfuls was comparable to an ants' nest when one removes the stone beneath which it is constructed. The "staphs" were most numerously represented, *Homalotæ* and *Steni* absolutely swarmed, but a species of *Bembidium*, *B. Mannerheimii*, ran them very close.

To begin in order at the beginning with the GEODEPHAGA. There were two *Notiophili*, *N. palustris* and *N. biguttatus*, *Pterostichus strenuus*, and *P. nigrita*, *Anchomenus gracilis*, and *A. puellus*, the *Bembidia*, *B. Clarki*, *B. doris*, *B. obtusum*, and *B. Mannerheimii*. Of these there were only about three *B. doris*, but *B. Mannerheimii* absolutely swarmed. There was also *Dyschirius globosus* and *Dromius melanocephalus*. In a previous bag from the same spot I took *Agabus unguicularis*, but on this occasion I discovered no Hydradephaga.

Among the PALPICORNIA *Linnebius truncatellus*, *Helephorus aquaticus*, and *H. æneipennis*, *Ochthebius bicolor*, *Cercyon melanocephalus*, *C. analis*, *C. flavipes*, and of course *Megasternum bolitophagum* occurred.

Among the CLAVICORNIA the *Pselaphide* were well represented. *Tychus niger* was very common, there was also *Bythinus puncticollis*, *Bryaxis fossulata*, and *B. juncorum*, and the minute and unsettable *Euplectus ambiguus*. Then *Scydmaeus collaris* was plentiful, and one specimen of *Clambus armadillo* turned up. One specimen of *Meligethes viridescens*, a few *Cryptophagus scutiger*, two or three common *Coccinella*, and, exceedingly commonly, *Coccidula rufa*.

These concluded the Clavicornia if we treat STAPHYLINIDÆ separately. These latter formed by far the majority of the catch. The *Homalotæ* were (as far as I could identify them), *H. analis*, *H. circellaris*, *H. debilis*, *H. graminicola* (in myriads), *H. triangulum*, *H. hygrophora*, and of course *H. fungi*. Very common was *Oxyptoda opaca*, there were two species of *Aleochara*, *A. languinosa* and *mæsta*. *Astilbus canaliculata* was very common, and I was very pleased to identify the handsome *Myrmedonia collaris*, to me a new species. *Tachyporus humerosus* was abundant, more so than the three other species of this genus present, *T. chrysomelinus*, *T. hypnorum*, and *T. brunneus*. There was *Tachinus rufipes* in plenty, *Mycetoporus nanus*, a couple. Then came *Quedius semiceneus* very numerous, *Q. rufipes*, a single specimen, *Q. tristis* also was conspicuous. The *Philonthi* were well represented. I took two specimens of *Philonthus lucens* in a bag of refuse from the same locality last year, and this, I fancy, forms the only Irish record of this rare species¹. I could however find none in the parcel under investigation now. But there were *Philonthus laminatus*, *P. politus*, *P. varius*, *P. æneus*, *P. nigrita*, *P. puella*, and more abundantly almost than any other species, *P. trossulus*. There was *Ocyptus cupreus*, *Lathrobium brunnipes*, and (another species new to me) *Lathrobium quadratum*, *Oxytelus rugosus*, and *O. tetracarinalus*, *Platystethus arenarius*, *Trogophleus elongatus*, *T. corticinus*, and *Evæstethus ruficapillus*. The *Steni* were also very much in evidence, and the following species occurred;—*Stenus juno*, *S. æmulus*, *S. speculator*, *S. declaratus*, *S. unicolor*, *S. binotatus*, *S. pallitarsis*, *S. bifoveolatus*, *S. rusticus*, *S. tempestivus*, *S. flavipes* (very abundant), *S. similis*, *S. tarsalis*, and *S. latifrons*. There were also *Lesteva punctata* and *Homalium fossulatum*.

The Lamellicornia, Serricornia and Longicornia were groups unrepresented, but the following PHYTOPHAGA were more or less numerous;—*Chrysomela staphylea*, *Phædon tumidulum*, *Hydrothassa marginella*, *Longitarsus melanocephalus*, *L. picipes*, *L. brunneus*, and *Cassida flaveola*.

¹ It will be seen from p. 123, of the present issue, that Mr. J. N. Halbert has taken this beetle in Co. Cavan.—Eds.

Among the RHYNCHOPHORA *Apions* were very numerous. *A. fagi* took the lead, but *A. virens* was also plentiful. There were several specimens of *Eirirhinus scirpi*, *E. æthiops*, and *Sciaphilus muricatus*, one *Hypera punctata*, and one *Orchestes fagi*. Of the Heteromera I could discover no representative.

Such were the coleopterous captures in this bag of flood drift, at least such as allowed themselves to be captured; for although the mass was well shaken out, it is probable that many individuals refused to drop through the sieve, and so escaped. Nevertheless, we have here some hundred species, without counting certain species of *Trichopteryx*, which evade my attempts at identification. Of course the bulk of the species noted are common enough, but the list, and still more the number of individuals, which were quite beyond computation, manifest how profuse coleopterous life is, show how easily the student of this order may furnish himself with material, and give some slight idea of the beetle fauna of the Armagh district during a mild winter.

I ought not to omit some reference to the shells which abounded in this bag. My friend, Mr. B. Tomlin, of Llandaff, to whom I submitted them, tells me the following species are represented:—

Planorbis contortus, *Succinea elegans*, *Hyalinia alliaria*, *H. fulva*, *Cochlicopa lubrica*, and var. *fuscata*.

As to the Mollusca, Myriapoda, Arachnida, and other orders of Insecta besides Coleoptera, these I have no space to enumerate, even if I could name them; but to the urban student of nature on whom the days of winter hang heavy, I can recommend nothing more exhilarating or satisfying, than a bag-full, such as this was, of the floating drift that comes down on the floods of "February fill dyke."

NOTES.

BOTANY.

VASCULAR CRYPTOGAMS.

Equisetum Wilsoni.—The fruiting-time of this plant, as given in the English botanical text-books, and in *Cybele Hibernica*, is July and August. It may therefore be of interest to record the fact that along the Royal Canal last March and April there was a luxuriant growth of this horsetail, with abundance of fruit. Having had the plant under observation for only one year, I cannot say if this is an abnormal occurrence; and whether it will fruit again in July and August remains to be seen.—R. LLOYD PRAEGER.

PHANEROGAMS.

Hieracium cerinthiforme (Backh. in litt.), F. J. Hanbury, in Co. Kerry.—In the *Journal of Botany* (1886, p. 19) Rev. W. R. Linton and myself gave a form of *H. anglicum*, Fr., for Mount Brandon as "being in our judgment the var. *decipiens*, Syme," not speaking more definitely, as Mr. Backhouse spoke doubtfully of our naming. The other day Mr. Hanbury was with me looking over all my *anglicum* forms, and at once called the Brandon plant *H. cerinthiforme*. This justifies the name we gave, as the plant we then called *decipiens*, Syme (? the var. *amplexicaule*, Lond. Cat., 7th edition), has since been raised to specific rank as *H. cerinthiforme* by Mr. Hanbury. As such it has probably not been noticed for Kerry. We were very possibly wrong in stating in the same paper (p. 18) that we found *Alisma natans* in deep water, as well as *A. repens*, Davies, at the margin. It is very likely that the plants out in the lake, without floating leaves, may have been the same with the marginal plant; we thought at the time they were different; but the deep water plant ought to have been grown, if we had then had the means to see which it really was. *A. natans* must not stand for Kerry on our notice of it.—EDWARD F. LINTON.

ZOOLOGY.

MOLLUSCS.

The Common Mussel (*Mytilus edulis*) in Belfast Lough.—This bivalve has long been abundant in Belfast Lough. Large beds of them existed near low water mark at the edge of the Holywood Banks, and considerable quantities used to be brought into Holywood and used as food. This practice has to a large extent ceased of late. A few years ago a demand for mussels sprang up from Scotland, where they were used as bait in the East Coast fisheries. This Scotch demand in time assumed large dimensions. Several boats' crews were daily engaged during the winter and spring months dredging for mussels, and pulling them up in bunches from the bottom by means of strong iron rakes constructed for the purpose. The mussels were then conveyed to Belfast, in the boats that had taken them, during the latter part of the flood tide, and loaded on board of the Glasgow and Ardrossan steamers, after which the boats would drop down on the ebb tide to resume their work. The undernoted figures will show the dimensions this industry attained to in the year 1889, when over-fishing had its usual result, the following years showing a marked decline, till, in 1892-93, the trade virtually ceased altogether, diminished supplies having made it no longer worth following. Simultaneously with this the dredging of the new channel was going on. This important local work cut right through the point of Holywood Bank, where the principal mussel beds were situated, and virtually destroyed these; but, as since appears, the mussels were not exterminated; they only shifted their quarters; and, this spring, new beds, recruited by the few years rest, were discovered; and, the Scotch demand reviving, these beds proved fruitful and remunerative. Often, during February and March this year, have I seen from 15 to 18 boats engaged in mussel fishing, and an almost similar number, at a different time of the day, putting their takes on board of the Scotch steamers. The extraordinary and sudden development of this trade, after an interval of almost total cessation, will be best seen from the undernoted official figures, for which I am indebted to the courtesy of Mr. W. A. Currie, Secretary to the Belfast Harbour Commissioners. These valuable mussel-beds should be afforded the protection they require to prevent a repetition of the virtual semi-extirpation that so lately occurred.

EXPORTS of MUSSELS from the PORT of BELFAST during the months of January, February, and March, in the following years:—

Year.	Tons.
1889,	483
1890,	256
1891,	233
1892,	5
1893,	1
1894,	1,532

—R. LLOYD PATTERSON, Belfast.

BIRDS.

Spring Migrants at Armagh.—The arrivals of these birds vary a good deal this year from last, some being much earlier and others somewhat later. The Chiffchaff and Willow Wren came together on March 24. Swallows were seen by Mrs. Johnson at Loughgall on April 6th, but I did not observe them here till the 10th. The next arrival was the Cuckoo on April 17th, and on the following day I saw the first Swift. The Corncrake was late, for I did not hear it till April 28th. On May 5th, when out in quest of moths in the evening, I heard the Grasshopper Warbler. The latest arrival was the House Martin, which I did not see till May 7th. The Sand Martin I was not able to observe, as I did not visit any of its haunts.—W. F. JOHNSON, Armagh.

Arrival of Spring Migrants in Londonderry District.—Most of our summer visitors reached us this year at their usual date, one was however much before its time while another was much later. I heard the Chiffchaff first on 25th March. On the 3rd April the Sand Martins arrived. The Wheatear appeared at Inch on 9th April. Last year I heard the Willow Wren on 3rd April, while this year I did not hear it until 9th. The Swallows did not reach us till 15th April, a very late date for them. The Corncrake arrived on 24th April, the Cuckoo on 26th April, and the Sedge Warbler on 27th April. Mr. Milne saw a Swift on 29th April, the earliest date I have ever known it to arrive. I did not see it in numbers until 7th May.—D. C. CAMPBELL, Londonderry.

Summer Migrants in the Vale of Ovoca.—I heard the Chiffchaff on April 8th, the Sand Martins arrived on March 28th; the Swallows on April 1st, House Martins on April 3rd, Cuckoo on April 12th, Landrail on April 17th, and Swifts on May 7th.—J. HUNTER, Woodenbridge, Co. Wicklow.

Rare Birds in Achill Island.—In the *Zoologist* for April, Mr. J. R. Sheridan writes that on 12th December, 1892, he saw a male King Eider (*Somateria spectabilis*) near Dugort. Two Surf Scoters (*Edemia perspicillata*) were seen on 25th October, 1870, and one of them was shot. A third specimen was seen in Duach Bay in December, 1890. Two Mealy Redpoles (*Linota linaria*) were shot in Achill Sound in February, 1893, by Mrs. Harvey; Mr. Sheridan thinks this bird visits Achill every winter. An adult male Buffon's Skua (*Stercorarius parasiticus*) was shot by Mr. Sheridan on 29th December, 1892, near the village of Duach.

Woodlarks (*Alauda arborea*), breeding in Co. Wicklow.—After an absence of many years, five of these birds were observed in this locality during October, 1893. They remained all through the winter, and on the 26th of April we were fortunate enough to discover the nest of one pair which contained three young birds and an addled egg.—JOHN HUNTER, Woodenbridge, Co. Wicklow.

Woodcocks in May.—A correspondent writes to the *Limerick Chronicle* (May 3rd), "that a day or two since, Mr. Mollison, gamekeeper to the Hon. W. C. Trench, of Castleoliver, Kilfinane, found a Woodcock, with three young ones apparently about a fortnight old, in the demesne, near the castle."—ERNEST BENNIS, Limerick.

GEOLOGY.

Kitchen Middens in Co. Donegal.—These were examined and described years ago by Mr. Harte, County Surveyor, before the Royal Geol. Soc., Dublin, and more recently by Mr. Mahony, of Ramelton, in a paper read before the Geol. Soc., Glasgow. The inquiries of both these observers extended round the north and north-west coasts of Donegal. Subsequently, after examining those of Co. Antrim, I examined them, and was surprised to find the contents so different in some respects, that is, the total absence of worked implements and pottery—yet in this portion of Donegal and in Antrim both appeared to have been of very similar age, that is, they were commenced on Murrish, or Sea plains, before the accumulation of the dunes of Æolian Drift.

In Innishowen, Fanad, Roscuil, and Falcarragh, besides bones and shells, were only found the rudest implements, such as slabs for breaking on, and adapted stones that had been used as breakers, and “fire stones.” What were the latter used for? Were they heated and the fish fried on them? Or were they used for boiling purposes? The latter in these cases seems improbable; because if they were, we ought to have found, as in the Co. Antrim, the rude clay pots in which the water was boiled. The absence of flint implements seems remarkable, as Antrim flints appear to have been largely imported into Donegal and manufactured.

Near Knockbrack, to the south of Letterkenny, there seems to have been a factory at Curragh—as numerous chips, cores, and implements have been found there; while at the Brown Rock, between Letterkenny and Church Hill, a large bunch of worked flints were found—also in various places about the Kilmacrenan Barony, especially north of Rathmullen, worked flint can be picked up in the tillage. Curiously, in the south-west of the Donegal County, in the sand-dunes of the Bundoran neighbourhood, arrow-heads, made of the chert from the Carboniferous Limestone, were found in the Kitchen Middens by Mr. Knowles, of Ballymena. Why should worked implements be found at Bundoran to the south-west, and in Antrim to the east, while along the intervening coast in the Kitchen Middens of apparently the same age they have not been found?—G. H. KINAHAN, Fairview, Dublin.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a Rabbit from Master H. Harvey; a Monkey from T. G. Waterhouse, Esq.; two Long-eared Owls from H. L. Jameson, Esq.; three Stoats and a Guinea-fowl from Master R. L. Weldon; and eight Guinea-pigs from J. Condon, Esq. A large number of animals have been acquired by purchase, including a Malayan Bear, a Serval, a pair of Cranes, of Weka Rails, of Blood-breasted Pigeons, and of Laughing Kingfishers; a Brown Lemur, a Hog Deer, three Mandrills, a Baboon, a Puma, two Marmosets, a Bear, two Porcupines, two Griffon Vultures, four Red-shouldered Starlings, two Rosellas, twelve Rufous Weaver-birds, two Grey Parrots, a Purple-capped Lony, and three Egrets.

Upwards of 10,000 persons visited the Gardens in April.

DUBLIN MICROSCOPICAL CLUB.

APRIL, 19th.—The Club met at Dr. R. F. SCHARFF'S.

Mr. GREENWOOD PIM showed *Lachnea* (*Peziza*) *umbrosa* sent to him by Professor Johnson, who found it at Howth last autumn. The sporidia are beautifully verrucose, in this point differing very markedly from *L. stercorea*, which is exceedingly similar in general appearance; from its nearer ally, *L. hirta*, the present species is distinguished by the almost

globose instead of oval sporidia. Both *L. hirta* and *L. umbrosa* are probably often passed by in mistake for *L. stercorea*.

MR. G. H. CARPENTER showed *Dicranolasma scabrum* and *Amopaum Sorenseni*, two remarkable phalangids of the family *Trogulidae*, brought from Corsica by Dr. Scharff.

DR. M'WENEY showed preparations from the blood of a man affected with the disease known as spleno-medullary leukæmia. Nucleated red blood corpuscles were very numerous, and every stage of eccentricity in the position of the nucleus could be traced, from a position only slightly distant from the middle of the cell to an extremely peripheral one, and in many cases the nucleus could be seen protruding. Finally nuclei might be seen on the outside of the cells, and connected therewith only by a short bridge of nuclear substance, and numerous free nuclei were likewise to be found. The recognition of the latter was much facilitated by the very remarkable metachromatism which the nuclei of the erythroblasts showed as compared with those of the neighbouring leucocytes, a much deeper tinge being invariably struck with the nuclear stain. These observations appeared to the exhibitor of considerable importance in view of the wide differences of opinion that prevail amongst physiologists regarding the exact mode by which the nucleus of the erythroblasts is got rid of. They seem to point unmistakably to extrusion of the nucleus—the view formerly adopted by Rindfleisch and now advocated by Howells, but by no means universally accepted. Appearances indicative of fragmentation, and also perhaps of mitotic division, in these nuclei were likewise demonstrated. The power used was Leitz's oil-immersion, $\frac{1}{10}$ in., giving, with the low eye-piece, a magnification of about 900 diameters.

MR. M'ARDLE exhibited a fertile specimen of *Eulejeunea patens*, Lindberg, var. *erecta*, M'A., which he gathered on Ross Island, Killarney, in November of last year. From copious material he gives the following characters by which this new form may be detected:—Plant about a quarter of an inch long, growing on damp peat in dense compact patches of a bright yellow colour. Stem stronger than in the type, erect, irregularly branched, often secund, bearing numerous rootlets in isolated tufts up to the apex, which show well marked haustoria. Leaves closely imbricated, densely chlorophylliferous in the upper $\frac{2}{3}$ of the plant. Under-leaves (stipules) larger than in the species, ovate or sub-rotund, cleft for more than $\frac{1}{2}$ of their length into two obtuse (often acute) lobes. Amentæ short, consisting of four to six altered leaves. Perianths copious, lateral, sharply keeled, stalk of the capsule with three or four distinct articulations.

BELFAST NATURALISTS' FIELD CLUB.

APRIL, 17th.—Irish night. The President in the chair. The programme included report of work done by the Celtic class, by Mr. P. J. O'SHEA, conductor of the class; readings and recitations in Irish, by Miss Milligan, Miss Carey, Dr. St. Clair Boyd, and Messrs. Ward, Foley, Griffin, and Morrissey; and a paper on local Celtic topography, by Mr. F. J. BIGGER.

APRIL, 25th.—Annual meeting. The President in the chair. The Secretary (Mr. F. J. BIGGER) read the annual report, and the Treasurer (Mr. W. H. PHILLIPS), the statement of accounts, which were adopted. The report stated that the roll of members now stood at 480. The election of office-bearers was next taken up. Mr. F. W. LOCKWOOD was elected President, and Mr. LAVENS M. EWART, M.R.I.A., Vice-President. The Secretary and Treasurer resumed office, as did the Committee, with some slight alterations. The Secretaries of Sections then presented their reports as follows:—Miss S. M. Thompson, report of Geological Committee; P. J. O'Shea, report of Celtic class; Dr. St. Clair Boyd, report of Microscopical Section; W. H. Patterson, report of Ethnographical Committee. Suggestions for the improvement and extension of the Club's work were then considered.

DUBLIN NATURALISTS' FIELD CLUB.

APRIL, 28th.—Excursion to Kill-o'-the-Grange and Killiney. A party of twenty-five members proceeded by 12.45 train to Kingstown, where cars were in waiting to convey them to Kill-o'-the-Grange Brickworks. Fine sections of bluish Boulder-clay were examined here, in which marine shells of the genera *Astarte*, *Tellina*, &c., were observed. A section of sand and gravel was also visited. PROFESSOR SOLLAS, F.R.S., who conducted the party, briefly explained the nature of the deposits, and the theories as to their formation.

The early season was witnessed by the discovery here of *Trifolium procumbens* in full flower, while *Arum maculatum* had almost finished blossoming. Sterile stems of *Equisetum palustre* were observed near the brickworks by Dr. M'Weeney, who also searched the locality for fungi. Agarics were, as might have been expected, scarce; *Coprinus micaceus*, Fr., *Panæolus phalenarum*, Fr., and a few other manure-loving species alone being found. A fine specimen of *Polyporus* (*Fomes*) *fomentarius* was observed on a stump, while leaf-fungi were represented by *Puccinia malvacearum*, Mont., and *Synchytrium taraxaci*, De By.

A rapid drive brought the party to Killiney, where some interesting geological features on the summit of Ballybrack Hill claimed attention. Along the junction of the granite and Ordovician rocks, the former has invaded the latter rock along the cleavage-planes, with the result that in places the shales have been entirely eaten up, nothing remaining to attest their presence but bands of black mica in the granite. The botanists of the party were well pleased to find among the gorse and rocks, abundance of the rare *Corydalis claviculata*, some of the plants already in good flower.

Descending to the beach, the remainder of the afternoon was devoted to investigating the fine sections of the drift that extend continuously from Killiney to Bray, and which were recently described in the *Irish Naturalist* by Professor Sollas (January, 1894, p. 13).

Along the shore the botanists found *Honkeneya peploides* already in flower, and *Viola arvensis* was taken by Dr. M'Weeney in a grass field near the mouth of the Loughlinstown river. The locality was not apparently an inviting field for entomologists, but Messrs. W. F. de V. Kane and G. H. Carpenter were fortunate enough to discover numerous specimens of *Clunio marinus*, Halid., a small marine dipteran which seems to have been overlooked since its describer, nearly forty years ago, took it on the coasts of Kerry and Dublin. The present discovery was specially gratifying, as among a colony of the midge observed upon a rock covered by green seaweed (*Cladophora*) two examples of the hitherto unknown female were obtained, and this sex is found to be wingless. Subsequent examination of the *Cladophora* disclosed a larva—also unknown hitherto. (A preliminary note by Mr. Carpenter, with figures, will shortly appear in the *Ent. Mo. Mag.*). Prof. Johnson and Mr. R. J. Mitchell assiduously collected seaweeds, but were not rewarded by any form new to the coast. Tea was provided at the Bray Temperance Hotel, after which a short business meeting was held for the election of new members.

ROYAL IRISH ACADEMY.

APRIL 9.—Mr. G. H. KINAHAN read a paper on Quartz, Quartzite, and Quartz-rock. Mr. Kinahan has already laid before readers of this Journal his views as to the origin of these rocks (*I.N.*, 1892). Prof. SOLLAS, F.R.S., and Mr. McHENRY (H.M. Geol. Survey) took part in the discussion that ensued

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THE IRISH FIELD CLUBS.

BY R. LLOYD PRAEGER, B.E.,

Secretary Dublin Nat. Field Club; Ex-Secretary Belfast Nat. Field Club.

I.—THE BELFAST NATURALISTS' FIELD CLUB.

IN these modern days, when the number of persons who take an intelligent interest in the natural phenomena by which they are surrounded is steadily increasing, and when the army of observers and investigators in every department of science grows larger year by year, any institution whose object is the advancement of science, and especially the popularization of science, is sure to have our sympathy; and in no way, perhaps, has more been done to popularize natural science, and to enlist fresh recruits in scientific work, than through the instrumentality of the various Naturalists' Field Clubs which are scattered through the country. Carried on on a popular basis, and with a low subscription rate, the advantages of these societies are within the reach of all; and especially by their summer excursions, when the field naturalists have an opportunity of visiting selected localities under scientific guidance, are the members brought into actual contact with nature—the more so since skilled workers in the various “ologies” are generally present, who are able and willing to impart the lore pertaining to their several crafts, and thus to reveal to untrained eyes the thousand marvels that lie hid in field, and wood, and stream, and rock.

Here in Ireland, we cannot boast that by any means so general an interest is taken in natural science as in England; but within the last decade there has been a most gratifying and encouraging increase in the number of workers; and a result of this has been that the Belfast Field Club, for over 20 years the only society of the kind in Ireland, received in 1887 a comrade in the shape of the Dublin Naturalists' Field

Club; while within the last two years it has been our pleasant duty to record in these pages the foundation of similar societies in Cork and Limerick. I have thought that a short sketch of the history and work of each of these Clubs may be of interest to readers of the *Irish Naturalist*; and we shall begin with the oldest and also the largest of the Irish Field Clubs, the

BELFAST NATURALISTS' FIELD CLUB.

We find the stimulus which resulted in the foundation of this Club in the courses of lectures in geology, botany, and zoology delivered in Belfast under the auspices of the Science and Art Department by Mr. Ralph Tate (now Professor Tate, F.G.S., of Adelaide University) during the winter of 1862-3. Mr. Tate possessed in a rare degree the power of interesting his hearers, and drawing them with him into the regions of science, and his lectures were largely attended, and his students remarkably successful in the examinations that were subsequently held under the Department. As a practical outcome of Mr. Tate's teaching and example, we find, in the Belfast Press of January, 1863, letters advocating the formation of a Naturalists' Field Club. The first suggestion came from "W. T. C." (William T. Chew), and his letter was soon followed by two others, signed "A Young Geologist" (Hugh Robinson), and "S. A. S." (Samuel Alexander Stewart). With the hearty co-operation of Mr. Tate, the preliminary steps were soon taken, and a public meeting was held in March, when the Club was formally constituted, and members were enrolled. Looking at the prospectus which was then issued, of which I possess almost the only copy now in existence, we find that the first President (then "Chairman of Committee") was John Grainger, M.A., subsequently Rev. Canon Grainger, D.D. The first Secretaries were Mr. Tate and Mr. Chew; while the two other originators of the Club took places on the Committee. Of these, Mr. Chew's name disappears early from the Club records, owing to his removal to London. Canon Grainger and Mr. Robinson maintained a warm and active interest in the Club until their deaths, but a few years; and Mr. Stewart has, during, the thirty-one years that have elapsed, held his place on the Committee, and holds it still, a loved and honoured member. The prospectus concludes with the list of original members, 107 in number, among which it is pleasant to notice

the names of not a few who are still members of the Club, and of others who have left behind them indelible records in the annals of science—notably Prof. Wyville Thomson, of “Challenger” fame, and Prof. James Thomson, afterwards of Glasgow University.

Founded thus auspiciously, the Club steadily grew, notwithstanding the loss by removal to London of both Mr. Tate and Mr. Chew at the end of the first year of its existence; at the end of the fifth year, we find the membership has risen to over 200, and its annual report, which has been steadily increasing in bulk, now extends to 50 pages. Two years later the annual report gives evidence of a new departure, in the publication of the first of the “Appendices” which have since been issued from time to time—being local lists of various divisions of the fauna and flora of the North of Ireland, or descriptive papers of its archæology; the first contribution being appropriately a “List of Irish Liassic Fossils,” by Mr. Tate. During the winter of 1869 a partial fusion with the Belfast Natural History Society was carried out. This latter Society was already in the prime of life, having being founded in 1821, and having in its ranks a number of gentlemen eminent in natural science. The first joint meeting was held in November, 1869, when Dr. Wyville Thomson delivered an address on “The Aims of Natural History Societies, and the uses of Local Museums.” During the next year, however, this connection was dissolved.

In anticipation of the Belfast meeting of the British Association in 1874, the Field Club undertook the preparation of a local guide-book, and though the time was very limited, they succeeded in producing a volume of over 300 pages, dealing with the fauna, flora, geology, archæology, trade and statistics of the district, which is a worthy proof of the energy and attainments of the Club members at that time.

The year 1875 records the retirement from the Secretaryship of Mr. William Gray after ten years of office; to his zeal and energy is largely due the progress made by the Club during that period. Five years later his worthy colleague, Mr. Hugh Robinson, retired, after 11 years of office; these vacancies were filled up by the appointment of Mr. William Swanston and Mr. F. W. Lockwood, who faithfully carried on the work of the Club for periods of 15 and 11 years respectively. The year

1875 also witnesses the adoption of the title of "Annual Report and Proceedings" for the Club's publication, which had by this time assumed the proportions of an annual instalment of 80 to 100 pages.

The years 1875 to 1890 provide a record of steady prosperity, and good work, as witnessed by the numerous "Appendices," so that in 1886, a volume of these was published in collected form, comprising twenty-one papers illustrated by twenty-seven plates, and dealing with the Foraminifera, Coleoptera, Ostracoda; Post-tertiary, Glacial, Cretaceous, Liassic, Carboniferous, and Silurian Fossils; Fungi and Mosses; and Cromlechs of the North of Ireland. The summer excursions and winter meetings went on regularly, with good attendances, while the membership fluctuated between 220 and 300. The Presidents during the first decade had been Canon Grainger, D.D., George C. Hyndman, and Professor James Thomson, F.R.S.; during the second decade the office was held in succession by John Anderson, F.G.S., Canon M'Ilwaine, D.D., William Gray, Robert Young, and Lieut.-General Smyth, F.R.S.; while the interval up to 1890 was filled by W. H. Patterson and Hugh Robinson, two of the original office-bearers of 1863.

In 1890 the retirement of Mr. Swanston from the post which he had so honourably held for 15 years, led to the appointment of the writer to the Secretaryship; and when a year later Mr. Lockwood asked to be relieved of his duties, Mr. F. J. Bigger was selected to fill the vacant place. It was about this time that there began that increase of interest in Irish science of which I have already spoken, and which is witnessed by the establishment of the three other Irish Field Clubs, and also of the *Irish Naturalist*. Its influence soon became apparent in the Belfast Club, and taking advantage of the flowing tide, the Club rapidly advanced in numbers and in popularity, so that, with a membership of 250 in 1890, the list at the time of writing stands within one or two units of 500. This great increase of membership has been accompanied by a corresponding widening of the sphere of scientific work, and of the amount of work done. It has been found desirable to form sections for the prosecution of special branches of research, and at present there are five such sections in operation. The Microscopical Section is the oldest, being started in 1891, and under the Secretaryship of Dr. St. Clair Boyd is doing good

work. The Photographic Committee have under their care the formation of an illustrated antiquarian survey of the district, which already numbers 400 platinotype photographs, and is rapidly increasing, thanks to the generosity of the photographers of the Club, and especially of that talented artist Mr. Robert Welch. The Ethnographical Section is engaged at present chiefly in collecting local folk-lore, under the Secretaryship of Mr. W. H. Patterson, and it is connected with the Ethnographical Committees in Dublin and London, which Professor Haddon has been instrumental in bringing into existence. The operations of the Celtic Section consist of a weekly class for the study of the Irish language, which is ably conducted by Mr. P. J. O'Shea, a member of the Club. And lastly the Geological Section, of which Miss S. M. Thompson is Secretary, is hard at work on the Glacial deposits of the district, and the first report, which was recently submitted to the Club, shows that interesting results have already been obtained, and gives good promise for the future.

The Presidential chair since 1890 has been filled by Mr. William Gray, Mr. John Vinycomb, and Mr. W. Swanston, and each of these gentlemen has done much to aid Mr. Bigger and myself in our secretarial work. My own removal to Dublin last year has thrown the entire work of the Club on my late colleague, under whom the Club is still rapidly increasing in numbers and usefulness. Nor must mention be omitted here of the successful course of lectures delivered under the auspices of the Club last winter by Prof. Grenville Cole, which have stirred up much interest in local geology, and strengthened to a considerable extent the Geological Section of the Club. I understand that courses of lectures on similar lines are to be delivered next session, and there can be no doubt that in this direction the Club is performing most valuable educational work.

In no way is the prosperity and usefulness of the Belfast Naturalists' Field Club better shown than by its annual Proceedings. Commencing in 1865 with a 12-page pamphlet covering two years of work, this publication has steadily grown, so that the last issued part (1892-3) comprises 170 pages of letterpress, with nine plates and ten other illustrations, and includes important contributions to the fauna, flora, geology, and ethnography of the North of Ireland.

A BOTANICAL TRIP TO CO. ANTRIM.

BY W. A. SHOOLBRED, M.R.C.S., CHEPSTOW.

THE following notes are from observations made during a short trip to County Antrim in July, 1893.

My chief object, botanically, in visiting this part of Ireland was to make a collection and take notes of the *Hieracia* of the cliffs and glens.

By the middle of July in an ordinary season most of the species of this genus would have been at their best ; but owing to the long, hot, and dry summer many of those growing in exposed parts of the cliffs were too far gone for identification. In fact the majority of the cliff-plants had long since gone to seed, and many were quite dried up.

My first day at Belfast was anything but propitious ; there was an incessant downpour of rain until six in the evening. It was almost the first rain I had seen for nearly three months. However, after it had ceased, Mr. S. A. Stewart kindly went with me to Holywood for *Rosa hibernica*. This rose does not appear to ripen its fruit, at least in this locality. On the marshes near we gathered *Enanthe Lachenalii*, and searched some time for *Zannichellia polycarpa* in the shallow water, where Mr. Stewart had always before seen it in abundance ; but although nearly poisoned by the stench caused by stirring up the sewage, we failed to find a single piece. Mr. Stewart has since sent me specimens from a deep drain near by, where he subsequently found it in plenty. The dry weather had doubtless caused the sewage in the shallow water to become too concentrated for the plants to live.

Next day, after I had visited Cave Hill, Mr. Stewart again joined me in the evening in a walk to part of the Black Mountain for *Pyrola media*, which, like so many other plants, had gone out of flower. *Melampyrum sylvaticum* we failed to find in its locality here, it having probably seeded down and died off.

From Belfast I went on to Larne, staying there for one night in order to visit Sallagh Braes. Unfortunately I did not give myself enough time for this expedition, and the heat when the cliffs were reached was too great for much scrambling after a mid-day walk from Larne.

From Larne I went on round the coast, staying at Cushendall, Ballycastle, and Giants' Causeway; thence to Derry for steamer to Glasgow. On the way from Portrush to Derry the journey was broken for a few hours to visit Benevenagh.

My longest stay was at Cushendall. Finding that a good centre, and surrounded by fine botanising country, my quarters also at 'The Glens of Antrim' being everything that could be wished, I remained there a week, which was longer than I had intended, and so had less time for working the country further on. Two days out of the week, however, it rained in such torrents that out-door work was well nigh impossible. The rest of the time the heat in the glens was almost tropical.

The coast scenery of County Antrim is certainly very fine, and would alone have repaid one for the trip. The contrast between the white Chalk cliffs with their capping of dark basalt and the deep red sandstone of Red-bay has a very striking effect. The Giants' Causeway, so interesting to the geologist, seemed rather barren botanically.

With a flora so varied, including as it does a considerable number of maritime forms, the luxuriant vegetation of the glens with their wealth of ferns and other shade-loving plants, and a cliff flora including several highland types, I was surprised at the rarity, or total absence from the district, of many species which are of common occurrence in the West of England. The common Yew and the White Beam, which form quite a feature in many of the wooded valleys of this part of England, were conspicuous by their absence. Among others of our common plants which I did not see in County Antrim were *Papaver Rhæas*, *Malva moschata*, *Bryonia dioica*, *Galium Mollugo*, *Lamium Galeobdolon*, *Tamus communis*, &c. Mr. Stewart tells me that one of the rarest plants in N.E. Ireland is the Moschatell, which may be found here in almost every hedgerow, and completely carpets some of the woods in early spring. I also failed to notice any of the sub-erect *Rubi*, but as they were not specially searched for they may have been overlooked.

The flora of the North-East of Ireland has been so thoroughly worked that it is unlikely that I can add much, if anything to what is already known. Mr. Praeger, however, tells me that two species of *Hieracium* and a variety of another species have not previously been recorded from the district.

One or two of the *Rubi* may be new records—*R. Selmeri*, at least, has only within the last few months been described as a British plant by the Rev. W. M. Rogers.

I am indebted to the Rev. W. M. Rogers for looking over my collection of Brambles and Roses; to Mr. Hanbury for putting me right as regards the *Hieracia*, and to the Rev. E. S. Marshall for naming some varietal forms of other plants.

LIST OF RARER PLANTS.

Fumaria pallidiflora, Jord.—The Rev. S. A. Brennan drew my attention to this growing in a hedgerow at Knocknacarry.

Nasturtium palustre, DC.—Glendun.

Arabis sagittata, DC.—Benevenagh, Co. Derry. I have no note of this from the Antrim cliffs. This plant appears to be rare in N.E. Ireland. It is very common on limestone cliffs and walls in this part of the West of England.

Draba incana, L.—Sparingly on the higher part of the cliffs at Benevenagh.

Cochlearia Armoracia, L.—Near Cushendun—garden escape.

Viola palustris, L.—Boggy ground, Glenariffe; Glendun; Fairhead, and near Ballycastle.

V. canina, L.—Cushendun, near the shore.

Polygala vulgaris, L.— } Common.

P. serpyllacea, Weihe.— }

Silene acaulis, L.—Fairly plentiful on Benevenagh.

Arenaria verna, L.—Plentiful on the cliffs on the south side of Glenariffe, and on Benevenagh.

Geranium lucidum, L.—Glenariffe.

Melilotus altissima, Thuill.—Glenariffe.

Trifolium medium, L.—Rocks near Ballintoy.

T. procumbens, L.—Glenariffe.

Lotus pilosus, Beeke.—Glenariffe.

Vicia sylvatica, L.—Glenariffe.

Prunus Padus, L.—One or two small trees seen in Glenshesk near the river.

Rubus rhamnifolius, W. & N.—Glenariffe and Glendun.

R. pulcherrimus, Neum.—Cave Hill; Glenariffe; Glendun; between Cushendall and Knocknacarry, &c. Of a specimen from Cave Hill, Mr. Rogers writes "with unusually broad panicle," and of specimens from near Larne "I believe *pulcherrimus*, but in a form I do not remember to have seen before."

R. villicaulis, Kœhl.—Glenariffe and Glendun.

var. **Selmeri**, Lindeb.—Glendun. Mr. Rogers writes "exactly like a form of *villicaulis*, common in the south of England, which is var. *Selmeri*, Lindeb."

R. Lindleyanus, Lees.—Glenariffe and Glendun. A very striking-looking form as regards foliage, grows in Glenariffe, which Mr. Rogers considers cannot be kept separate from *Lindleyanus*. It has unusually broad terminal leaflets, and very large panicles.

R. rusticanus, Merc.—Near Larne; Glenariffe; Glendun, &c.

R. pyramidalis, Kalt.—Glenariffe.

R. leucostachys, Schleich.—Cave Hill; near Larne; Glenariffe, &c.

R. radula, Weihe.—Hedge-rows near Larne.

R. echinatus, Lindl.—Cave Hill; Glenariffe; Glendun, &c.

R. rosaceus, W. & N., var. **hystrix** (W. & N.)—Glenariffe. Mr. Rogers writes "A strongly armed form."

R. Kœhleri, W. & N.—Glenariffe and Glendun.

R. dumetorum, W. and N.—Cave Hill; near Larne, &c. Of a plant from near Larne Mr. Rogers writes "I think it must be a very weakly-armed form of aggregate *dumetorum*. The foliage is very like that of our var. *diversifolius*, but the armature quite different."

R. corylifolius, Sm., var. a. **subulstris**, (Lees)—Common.

var. b. **conjungens**, Bab.—Near Larne.

R. saxatilis, L.—Frequent. In company with Mr. S. A. Stewart I gathered this in good fruit on the Black Mountain near Belfast.

I have notes of having seen *R. erythrinus*, Genev., and *R. micans*, Gren. & Godr. in Glenariffe and Glendun, but as I did not secure specimens I think it advisable not to include them in the list. The *Rubi* in these glens require and would repay careful working.

Potentilla procumbens, Sibth.—Glenariffe; Glendun; and Glenshesk.

P. procumbens x Tormentilla—(*P. suberecta*, Zimm.)—Glenshesk. The Rev. E. S. Marshall kindly examined and named this plant for me.

Agrimonia odorata, Mill.—Glendun.

Rosa involuta, Sm.—Glendun; "a form of *involuta*," but the material sent was too imperfect for Mr. Rogers to name definitely.

R. mollis, Sm.—Glendun and Glenshesk.

R. tomentosa, Sm., var. **scabriuscula** (Sm.)—Near Cushendall. A form very near *sylvestris* (Lindl.), gathered with Mr. Stewart on the Black Mountain near Belfast.

R. rubiginosa, Linn.—Mr. Praeger had asked me to look out for *R. micrantha* at Cushendun, and Mr. Brennan kindly showed me the bush whence the specimens had been gathered on the evidence of which this rose was included in the "Flora of the North-East of Ireland." Mr. Rogers writes of specimens submitted to him "not *micrantha*. A form of *rubiginosa*."

R. canina, L., var. **lutetiana** and **dumalis**—Common.

var. **subcristata**, Baker.—Glendun, and sandy ground by the river in Glenshesk.

R. arvensis, Huds.—Remarkably scarce. One or two bushes seen in Glenariffe and Glendun.

var. **bibractiata** (Bast.)—Hedgerow near Cushendun.

(TO BE CONCLUDED).

THE HIGH AND LOW-LEVEL, SHELLY DRIFTS
AROUND DUBLIN AND BRAY.

BY T. MELLARD READE, F.G.S.

(Concluded from page 121).

It is now time to get to the *pièce de resistance*—the shelly gravels of the Three Rock Mountain, first disclosed to the scientific world by the Rev. Maxwell Close. I am specially interested in these deposits from a previous study of similar gravels in England and Wales. We examined the gravel pits at Ballyedmonduff, reached by us from Glencullen. They are evidently continuously connected with the valley drift, and these high-level gravels occupy a considerable area. The gravel is mostly of limestone, with a good proportion of granite boulders, also felstone, porphyry, Silurian grit, and purple conglomerate. The gravel is interbedded with sand, loamy sand, and sand and gravel. Some thin contorted bands of sand are to be seen. Shell fragments are common. No attempt was made at collection; and for a list of the species of mollusca found, the reader must refer to Mr. Close's original paper in the *Geological Magazine*, 1874, entitled "The Elevated Shell-bearing Gravels near Dublin."

A mechanical analysis of two specimens of the finer part of the drift showed that the finer gravel was well worn, and mostly limestone, mixed with sub-angular gravel. Some pieces of black limestone occurred, very polished and slightly striated. Among the smaller grains were well rounded and polished grains of quartz, also calcite, mica flakes, and very decayed grains of shell substance. Three minute siliceous cylindrical bodies were found in this material, and similar bodies occurred in other specimens of the drift from several localities, as well as in the Greenhills esker, at Balrothery, presently to be described. Dr. George G. Hinde, F.G.S., to whom these were submitted, pronounces them to be sponge-spicules. He writes: "They are for the most part portions of the long cylindrical spicules, of which the anchoring ropes of hexactinellid sponges, like the still existing *Hyalonema*, were composed, and they are the sponge remains most commonly present in Carboniferous cherts and limestones in Britain." The analysis disclosed the fact, that there was a considerable

amount of granitic gravel and detritus among the other material.

Further on we examined the site of an old gravel-pit, formerly a mound or mammelon, but now levelled and grass-grown. We had no time to examine the other numerous pits scattered about the mountain and mentioned in Mr. Close's paper, but I saw sufficient to enable me to understand the deposit in the light of the other high-level shelly gravels I have seen and studied.

Those interested in glacial phenomena should not omit to visit Loughs Bray. At Curtelstown in Glencree, on the road to these interesting corries, is a gravel-pit west of the Roman Catholic Church, in which the gravel is mostly granitic detritus mixed with some limestone pebbles, and containing many large granite boulders. Notwithstanding the unlikely-looking aspect of this material, a few minutes search resulted in the discovery of a fragment of a bivalve. The level is about 770 feet above the sea. Lower Lough Bray is about 1,225 feet above sea level, and Upper Lough Bray 1,480, according to my aneroid observations. The striking feature of these corries or cwms is that they are all in granite, and the moraines that enclose their lower margins, considering the small area from which the material can have come, are remarkably large. The moraine of the upper lough rises 80 feet above the surface of the water, and is very broad at the base, in fact shades off into the valley below in great parallel undulations. One block perched on the summit I estimated to be 25 feet high. The upper part of the inner slope of the moraine was at an angle of 35 degrees. The great bulk of material in these moraines must have taken a great length of time to accumulate, and evinces a long life of the small glacier that made them.

We have now nearly come to the end of the descriptive part of this paper, but must pause to say something of the Greenhills esker. The question of the origin of eskers I do not propose to discuss here. It is a subject to be considered apart from the general glacial drift, and demands much more careful consideration than it has yet received. Our exploration of the Greenhills esker was confined to one day. We began at the Balrothery end. I am simply recording facts, and refrain from drawing any inferences from them. A very careful search in the gravel-pit at the Balrothery end of the esker, the first we came to, rewarded my son Aleyn with the discovery of a small

portion of a *Turritella terebra*, and myself with a rounded and chalky shell fragment pronounced by Mr. R. D. Darbishire, F.G.S., to whom all the shells were submitted, to be a portion of a *Mya*; also some extremely minute but indeterminable shell fragments. A specimen of the finer material of the esker was mechanically analysed; the material proved to be mostly dark and grey limestone, the grains being pretty well rounded. Amongst it were some spongespicules and two grains having shell-structure. Some pebbles of granite were found in the gravel at this end. We walked along the top of the esker, and examined other gravel-pits, but the material appeared to be very barren, and the granite seemed to be absent. At the northern end the gravel and loam is seen to be horizontally bedded, and at one part a deposit that might be called boulder-clay occurred.

A story is nothing without a moral, and a geological paper without conclusions. The phenomena described ranged well with most of the observations of high and low-level drift it has been my good fortune to see. It supplements some of the defective portions of the story as told in deposits elsewhere, and strengthens other conclusions. It appears to me to lend no support to the Irish Sea Glacier hypothesis. The general drift of the materials has been from the north-west, and they have been swept from the limestone plain far on to the granite mountains. The major part of the granite debris is doubtless from the Wicklow Mountains, and some of this has travelled north on to the limestone. Granite from the Mourne Mountains and from Newry are, I believe, found in the drift, but I had neither time nor the requisite local petrological knowledge to follow up this part of the problem. Triassic rock from the North I have already recorded. Professors Cole and Sollas have found the Ailsa Craig riebeckite in the drift as far south as Greystones. Flints from Antrim are common. There is a commingling of rocks here, as in the drifts of England and Wales, but not perhaps from so great a base-line. The whole of the phenomena in my judgment points to submergence. This is not the place to appraise the relative value of the facts recorded, but those who wish to pursue the subject further on the lines here sketched out may be referred to the article in *Natural Science*,¹ on high-level shelly sands and gravels in which I have discussed some of the questions from several points of view.

¹ Vol. iii. (Dec. 1893.)

So ends the simple record of a very enjoyable time spent in Ireland, which from the pleasant aid rendered, the perfect weather, and the interesting nature of the geology and scenery, will not readily be effaced from the memory.

INSECTS COLLECTED BY THE ROYAL IRISH
ACADEMY FLORA AND FAUNA COMMITTEE,

1893.

BY REV. W. F. JOHNSON, M.A., F.E.S., J. N. HALBERT, AND
GEORGE H. CARPENTER, B.SC.

COLEOPTERA.

(Continued from page 124.)

PSELAPHIDÆ.

Bryaxis fossulata, Reich.—Ballyhaise.

SILPHIDÆ.

Anisotoma punctulata, Gyll.—Coolmore. Only other Irish locality is Portmarnock.

A. calcarata, Er.—Coolmore.

Necrophorus humator, F.—Coolmore, in dead gulls.

N. ruspator, Er.—Coolmore, in dead rat.

Necrodes littoralis, L.—Coolmore, in dead gulls. Only other Irish localities are Armagh and Dublin.

Silpha rugosa, L.—Coolmore, common in carrion.

S. atrata, L. var. **subrotundata**, Steph.—Coolmore. Very common about Cavan, the black form at Oak Wood, Ballyhaise. Berehaven. Killarney (brown form).

HISTERIDÆ.

Onthophilus striatus, F.—Slieve Glah, by sweeping in a marshy spot.

COCCINELLIDÆ.

Adalia oblitterata, L.—Farnham.

Coccinella x-punctata, L.—Coolmore.

C. hieroglyphica, L.—Coolmore. Berehaven. Hitherto recorded only from Churchill, County Armagh, and Waterford.

C. xi-punctata, L.—Coolmore, common in the sandhills.

C. vii-punctata, L.—Berehaven. Cavan.

Halyzia xviii-guttata, L.—Ballyhaise.

H. conglobata, L.—Oak Wood, Ballyhaise. Holiday records it from near Belfast, and Fowler from "the south of Ireland."

H. xxii-punctata, L.—Common about Cavan.

Coccidula rufa, Herbst.—Coolmore. Dundalk. Ballyhaise,

NITIDULIDÆ.

- Epuræa florea**, Fr.—Coolmore. Carlingford.
Meligethes æneus, F.—Coolmore. Carlingford.

TROGOSITIDÆ.

- Tenebrioides mauritanicus**, L.—Coolmore, in a loaf of bread.

CUCUJIDÆ.

- Rhizophagus dispar**, Gyll.—Coolmore.

LATHRIDIIDÆ.

- Cononimus nodifer**, Westw.—Cavan.
Enicmus minutus, L.—Coolmore. Cavan.
E. transversus, Ol.—Cavan.
Melanophthalma gibbosa, Herbst.—Wood at Cultragh Lough.

CRYPTOPHAGIDÆ.

- Cryptophagus scanicus**, L., var. **patruells**, Sturm.—Coolmore.
C. cellaris, Scop.—Coolmore.
 ***Paramecosoma melanocephalum**, Herbst.—Banks of River Annalee, near Ballyhaise.

BYTURIDÆ.

- Byturus tomentosus**, F.—Carlingford.

BYRRHIDÆ.

- Byrrhus pilula**, L.—Berehaven.
Cytilus varius, F.—Shores of Lough Oughter under stones. Slieve Glah.
Simplocaria semistriata, F.—Coolmore.

PARNIDÆ.

- Elmis parallelipedus**, Müll.—Coolmore. The other Irish localities are Waterford and near Bandon, Mr. Wollaston recorded it from the river Flesk, Killarney (*Zoologist*, 1847, p. 1571), and there are specimens in Mr. Haliday's collection from Lough Neagh.

- Limnius tuberculatus**, Müll.—Coolmore.

- Parnus prolifericornis**, F.—Coolmore. Shores of Lough Oughter.

LUCANIDÆ.

- ***Sinodendron cylindricum**, L.—Lough Oughter, dead specimens in a log of oak on the shore. Though this species seems never to have been definitely recorded, there are Irish specimens in the Haliday collection, and Mr. G. C. Champion took it at Bray in 1878.

SCARABÆIDÆ.

- Aphodius fimetarius**, L.—Coolmore. Ballyhaise. Berehaven.
A. ater, De G.—Coolmore.
A. prodromus, Brahm.—Ballyhaise. Dursey.
A. contaminatus, Herbst.—Ballyhaise.
A. rufipes, L.—
A. depressus, Kug.— } Coolmore.

Ægialia arenaria, F.—Coolmore.

Geotrupes stercorarius, L.—Coolmore. Berehaven.

G. sylvaticus, Panz.—Slieve Mishkish. Adrigole.

Serica brunnea, L.—Carlingford.

Phyllopertha horticola, L.—Berehaven; Hungry Hill. This chafer has been abundant in western Ireland during the last two summers, and serious damage to garden and clover crops has been reported as due to its ravages.

ELATERIDÆ.

Cryptohypnus riparius, F.—Coolmore.

Athous hæmorrhoidalis, F.—Berehaven.

Adrastus limbatus, F.—Dundalk, &c., common.

Agriotes obscurus, L.—Coolmore.

Corymbites quercus, Gyll.—Glengariff. We believe this to be the first record for S.W. Ireland; in fact there does not seem to be any record of its capture further south than Dublin.

DASCILLIDÆ.

Dascillus cervinus, L.—Adrigole. This also seems to be a new species in the south-west.

Helodes minuta, L.—Fathom.

H. marginata, F.—Adrigole.

Cyphon variabilis, Thunb. — Coolmore. Cavan, common. Killarney.

MALACODERMIDÆ.

Telephorus bicolor, F.—Berehaven.

Rhagonycha fulva, Scop.—Coolmore. Dundalk.

(To be continued.)

NOTES.

BOTANY.

FUNGI.

Two notable Morels—(*Morchella elata* and *M. crassipes*).—The Morel is almost the only fungus outside the ordinary mushroom, which is admitted—by others than Fungomaniacs—to be fit for human food; that is so far as Britain is concerned, for many others are commonly eaten abroad. The ordinary species, *M. esculenta* and *M. conica*, though nowhere very common, are found not unfrequently in various districts in suitable localities in April and May. They are usually about three or four inches high, the curious strongly ribbed pileus or cap being about half that size, and are generally met with in open spaces in woods, or partially shady banks.

Two remarkable forms came under my notice this year, both new to the Irish, and one, *M. elata*, to the British Flora. *M. elata* was sent to me from Clonbrock Demesne, by Mr. W. F. de V. Kane, and was shown

at a meeting of the Dublin Naturalists' Field Club, under the provisional, and, as it proved, erroneous name of *M. Smithiana* (see p. 111). Photographs, and subsequently, by the kindness of Lady Clonbrock, fresh specimens, were sent to Mr. W. Phillips, of Shrewsbury, the great authority on Fungi of this class, and he pronounced it without doubt as *M. elata*, Fries, and that it was the first British record. This species is described by Fries in his *Systema Mycologicum* as occurring in Italy, but rare. Cohn also records it in his *Kryptogamen Flora von Schlesien*. The specimen sent to me was nearly eleven inches high, and the pileus or cap four inches in diameter.

The second Morel was a very large and abnormal form of *M. crassipes*, and was found by Mr. Robertson in his garden at Ranelagh, Co. Dublin. It was quite distinct from the Clonbrock species in shape and on the arrangement of the ribs, the cap being rounded—while that of *M. elata* was markedly conical. I have to thank Mr. Phillips for kindly identifying this species also, as being quite abnormal. It did not accord at all with the figure in Cooke's *Mycographia*.

These two most interesting forms are preserved in the Dublin Museum—GREENWOOD PIM, Monkstown, Dublin.

PHANEROGAMS.

***Rubus villicaulis* Koehl., var. b. *Selmeri* Lindeb.**—Rev. W. Moyle Rogers has lately (*Jour. Bot.*, Feb. 1894), identified the glabrous form of *Rubus villicaulis* with *R. Selmeri* Lindeb., a Scandinavian plant, and proposes to class it in future as var. b. *Selmeri*. The plant referred to from "N. Ireland" in his paper (p. 43) was gathered by me at Saintfield, in 1893. No doubt it will be found in other parts of Ireland. Mr. Rogers gives the following marks of distinction:—"It differs from typical *villicaulis* by its long styles (equalling or exceeding the stamens) its strong falcate prickles, its greener and more roundish lvs., and its much more glabrous condition generally."—C. H. WADDELL, Saintfield, Co. Down.

Whins injured by frost.—It was strange to miss the usual golden bloom of the Whins or Gorse this spring. One would think such hardy plants could not have been injured so much by frost. Nevertheless the appearance of the country side here at Easter was quite altered by the brown and withered flowerless plants instead of the usual glow. I suppose it must have been caused by the severe frost in January coming upon them in a too advanced state of flower, for many began to flower in November.—C. H. WADDELL, Saintfield.

Henbane (*Hyoscyamus niger*) on Howth.—It may be of interest to note that there is this year an abundant growth of the Henbane on the southern slopes, close to the Bailey Lighthouse. This rather rare plant, notoriously erratic and irregular in its appearance, has probably not been long in this station, or it could not have escaped the vigilant eye of Mr. Hart, who gives Ireland's Eye as the only place in the Howth district in which the Henbane is known to grow.—R. LLOYD PRAEGER.

***Cephalanthera ensifolia* in Co. Waterford.**—I was fortunate enough to find yesterday (June 1) a number of plants of *Cephalanthera ensifolia*, Rich. They were growing in a very wet, boggy place in the woods of Curraghmore. I gathered two specimens, one for my herbarium, and the other for planting in my garden. This represents a new District (ii.) in Ireland for this plant.

According to *Cybele Hibernica* it occurs in the following places:—District i., Glengariff, Adrigole, Co. Cork; xi., near Lough Eske, Donegal; xii., near Larne, Antrim; Shane's Castle Woods, shores of Lough Neagh. It has since (Recent additions to the Flora of Ireland, 1872, by Mr. A.

G. More) been found in three other localities in District i. I have, myself seen it growing at one of these localities, viz., in the wood near Lickeen House, Lough Caragh; but in 1891 there were only a few plants. It has also (*Journ. Bot.*, 1889) been found about half a mile east of Brickeen Bridge, Muckcross (i.) A new station is mentioned in the June number of the IRISH NATURALIST viz., Hare Island, Lough Ree, Westmeath, which also adds another District (vii.)

In his description of the plant, Bentham (5th edition, revised by Sir J. Hooker, p. 438) says:—"The bracts very short, mostly one to two lines long, or the lowest rarely as long as the ovary." The lowest bract in one of the specimens that I gathered is slightly more than half an inch longer than the ovary.—WILLIAM W. FLEMING, Coolfin, Co. Waterford.

ZOOLOGY.

CRUSTACEA.

Ligia oceanica on the Galway coast.—Mr. R. M. Barrington has obtained a specimen of this isopod on the "Stags of Broadhaven," Co. Mayo. This is the first record for any of the Irish islands, and the second for the west coast. (For description and figure of this species see my paper on the Irish Woodlice in January and February numbers of the IRISH NATURALIST, 1894).—R. S. SCHARFF, Dublin.

INSECTS

Leucophasia sinapis and Melitæa aurinia in the Co. Waterford.—Of the first-mentioned butterfly I was fortunate enough to capture two specimens on the 16th of May. I have never before seen them here. Five years ago, my friend, Mr. R. Reynett, an excellent entomologist, took one specimen here. He has already got seven this year. Of *Melitæa aurinia* I found, on the 26th of last month (April), three larvæ. They were feeding on one of their usual food-plants, viz., *Scabiosa succisa*. Two of them have already (May 22) changed to pupæ.—WILLIAM W. FLEMING, Coolfin Rectory, Portlaw, Co. Waterford.

Larvæ of Vanessa atalanta. A correction.—A friend suggests that I should correct a slight error in a note on larvæ of *Vanessa atalanta* in the March number of the IRISH NATURALIST (p. 67). The larvæ referred to as sent in January by me to the Editor of the *Entomologists' Record*, were not found then, but had been reared indoors from about November 1st. I have had *V. atalanta* emerging freely from pupæ up to Christmas, and a few much later; but in no case have I found larva or pupa alive after November 1st, about which time last year we had some heavy hoar frosts, and I do not believe that even in our mild climate it is possible for the butterfly to survive the winter save in the perfect state. Pupæ seem more easily destroyed by cold and damp than larvæ, and I found considerable difficulty sometimes in procuring nettles for them through the winter.—JOHN J. WOLFE, Skibbereen, Co. Cork.

Wasps at Bray.—Mr. R. M. Barrington has kindly sent me a lot of queen wasps, as he did last year (IRISH NATURALIST, vol. ii., p. 199). The great majority again prove to be *Vespa vulgaris*; only two *V. rufa* were to be found, while there were fifteen specimens each of the two tree-building species—*V. sylvestris* and *V. norvegica*. I was glad to find eight examples of *V. germanica*, a species not in last year's consignment. The rare *V. arborea*, however, which so agreeably surprised us last year, was not to be found on the present occasion.—GEO. H. CARPENTER.

MOLLUSCS.

Pearl Fishing in the Strule.—In the past week quite a number of valuable pearls were found in the Strule, between Omagh and Newtownstewart. E. Mullan got one weighing ten grains, and for which he refused £10. Thomas Short got six, all good colours and shapes; William Muldoon, nine pearls; J. Donnelly, fourteen, four of which were perfection, and very valuable. The Strule, without exception, is the best river in Ulster for pearls.—*Belfast News-Letter*, 6th June, 1894.

BIRDS.

Long-tailed Ducks in Wexford.—I received about March 24th, an adult pair of Long-tailed Ducks, together with a female Scoter, from a fowler of Wexford Harbour. According to Mr. A. G. Moore (*List of Irish Birds*, Ed. II., p. 36), the Long-tailed Duck is a "rare winter visitor, in small numbers, chiefly occurring in the North of Ireland."

I have no previous record of its occurrence in the Co. Wexford, except that given in Thompson's "*Natural History of Ireland*," (vol. iii., p. 141.)—G. E. H. BARRETT-HAMILTON, Trin. Coll., Cambridge.

The Dusky Shearwater (*Puffinus obscurus*, Gm.).—Through Mr. Ussher's efforts, the unique Irish specimen of this bird has been secured for the Dublin Museum. Mr. Ussher was good enough to inform me that it flew on board the "Olive" on the 11th May, 1853, near the Bull Rock on the coast of Kerry. It was immediately identified on the island of Valentia by Mr. Bewicke Blackbourn, in whose possession the bird remained until Mr. Ussher induced the owner to present it to the Museum. This identical specimen is figured in Yarrell's *British Birds*.—R. F. SCHARFF.

MAMMALS.

The Marten in Co. Donegal.—With reference to Marten in Co. Donegal, I should tell you that I had the remains of one, killed and stuffed by my uncle, the late T. B. Hart, at Glenalla, thirty or forty years ago. So that so far as these woods are concerned, the testimony is more than eyesight and hearsay. The specimen was badly stuffed and subsequently worried by a terrier.—H. C. HART, Carrablagh, Co. Donegal.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations include two Guinea-Pigs from J. H. Higgins, Esq.; Rabbits from H. G. McNight, Esq., and T. Williams, Esq.; three Cormorants from Major Murphy; a pair of Cereopsis Geese from General Sir R. Sankey; and a pair of Ravens from S. B. Wilkinson, Esq.

An Orang-outang has been deposited in the gardens by Mr. W. Cross, of Liverpool, so that visitors have now the rare privilege of seeing two of the Anthropid Apes alive in one collection.

About 11,000 persons visited the Gardens in May.

DUBLIN MICROSCOPICAL CLUB.

The Club met at Mr. GREENWOOD PIM'S, who showed specimens of *Aecidium leucospermum* growing on *Anemone coronaria* in his garden. This species is stated by Plowright to be uncommon in the *Aecidium* stage, though the *Puccinia* is abundant. This *Aecidium* occurred last year on the same plants, and Mr. Pim heard of it this season in several quarters. It is a remarkably pretty form, the pendial divisions being white, and the spores golden yellow.

DR. M'WEENEY showed cultivations and a slide of a curious micro-organism isolated by him from purulent matter of a patient suffering from pyelo-nephritis at the Mater Hospital. Cultures in broth at 37°C. develop on the surface a ring of green pigmentation, which, if the depth of the vessel be not great relatively to the surface, gradually extends until the entire fluid is of a brilliant green colour. Young cultures briskly shaken become green throughout, but the colour speedily fades save at the surface. It requires atmospheric air for its development, and, as was pointed out to exhibitor by Professor Hartley, the fading of the colour is due to the reducing action of the living microbes in the deeper strata of the broth. Cultivations of this organism exhale a most peculiar sickly odour which is quite *sui generis*. Injected into animals it produces fatal septicaemia with a sort of emphysematous swelling at the point of subcutaneous inoculation. Morphologically it is a short actively inatile bacillus, with a tendency to stain more intensely at the poles, like the microbe of chicken-cholera. The slide was from peritoneal exudation of a rabbit that had succumbed to inoculation with this microbe which is perhaps identical with that described in *Comptes Rendus* for 1888 by Galtier, under the name of *Bacillus chromo-aromaticus*.

MR. H. H. DIXON exhibited Overton's Method of fixing and staining minute organisms. This process is carried out by means of a small moist cell in which the material to be fixed is kept in a hanging drop on the under surface of a cover-glass. In this position it may be observed with the highest powers until the stage in which it is desired to fix it is reached. At this moment the cover-glass is raised and a crystal of iodine is introduced into the cell and the cover-glass replaced. The vapour of the iodine fixes the organism, if small, almost instantaneously. The water may now be replaced by some watery stain. Overton recommends the replacing of the water by alcohol, in case other treatment is desired, by exposing the cover-glass, on which the drop of water has been changed for a drop of 20 per cent. alcohol to the vapour of absolute alcohol in a small chamber. In fixing and staining fungi the spores may be sown in a drop of nutritive solution which is thickened by addition of gelatine, so that during the whole process the plants which develop from them remain stationary; also collapse of the cells does not occur when they are transferred into glycerine-jelly.

DR. J. JOLY showed Paraffin casts of the vessels of plants obtained by himself and Mr. H. H. Dixon. In the course of some experiments upon the motion of liquid in plants, they caused cut shoots of lime and elm to draw up melted paraffin of low melting point (45° C.) into the vessels. On cooling and dissolving away the tissues with strong sulphuric acid, paraffin casts (of extreme fineness) of the vessels were isolated. These showed the pits as prominences of various shapes, and faithfully reproduced all the markings upon the walls; spiral, annular, etc. Such casts make very beautiful microscopic objects. The method may be used to determine the lengths of the vessels and their course.

BELFAST NATURALISTS' FIELD CLUB.

MAY 19th.—Excursion to Fair Head and Murlough Bay. A party of about 25 members left Belfast by the 6.30 a.m. train, reaching Ballycastle at 9.30, where breakfast was partaken of. The party then drove to

Lough-na-crannoge, near the summit of Fair Head, and walked along the edge of the stupendous cliffs of the promontory, and past the Grey Man's Path to Murlough Bay, the interesting geological features of which were lucidly explained by Mr. W. A. Traill. The party returned to Ballycastle at 5.0, when tea occupied their attention, and the return journey was accomplished, Belfast being reached at 9.0.

DUBLIN NATURALISTS' FIELD CLUB.

MAY 26th.—This Club made the second excursion of their summer session, the place selected being Maynooth. A party of nearly sixty members and visitors proceeded by the 1 o'clock train, and under the guidance of the Rev. T. B. GIBSON, B.A., the grounds of Carton, the Duchess of Leinster's beautiful demesne, were entered, and the afternoon was spent along the banks of the Rye water, where the zoologists and botanists found much to interest them, while the florists of the party were much charmed with the "wild gardening" that is carried to such perfection here, and whose beauties were ably demonstrated by Mr. Brown, head gardener, who accompanied the party during the day. The greater part of the demesne is too trim and well-kept to suit the taste of the wild-flower hunter, but some interesting plants were observed, such as *Arenaria trinervia*, which was growing in the greatest abundance; *Geranium lucidum*, *Saxifraga tridactylites*, *Veronica montana*, *Listera ovata*, *Viola hirta*, *Hypericum hirsutum*, *Hippuris vulgaris*. Messrs. H. G. Cuthbert and G. H. Carpenter collected insects, and obtained the following species of Beetles:—*Pterostichus strenuus*, *Anchomenus fuliginosus*, *A. dorsalis*, *A. gracilis*, *Bembidium bruxellense*, *B. flammulatum*, *Melolontha vulgaris*, *Aphodius erraticus*, *A. merdarius*, *Onthophilus striatus*, *Brachypterus urticae*, *Corymbites cupreus*, *C. quercus*, *Cryptohypnus riparius*, *Telephorus haemorrhoidalis*, *T. pellucidus*, *Rhagonycha limbata*, *Malthodes marginatus*, *Grammoptera ruficornis*, *Donacia bicolora*, *Hydrothassa marginella*, *Longitarsus melanocephalus*, *Cyphon nitidulus*, *Dasytes arosus*, *Galerucella tenella*, *Sciaphilus muricatus*, *Phyllobius calcaratus*, *Orchestes fagi*, *O. stigma*, *Caliodes quadrimaculatus*, *Cionus hortulanus*, *Ceuthorrhynchus litura*, *C. pollinarius*, *Ceuthorrhynchidius troglodytes*, and *Rhinoncus castor*. Among the Hemiptera, *Piezodorus lituratus*, *Tropicoris rufipes*, *Acanthosoma haemorrhoidale*, *Scolopostethus neglectus*, *Gerris argentata*, *Microvelia pygmaea*, *Lygus pratensis*, var. *campestris*, *Leocoris tripustulatus*, and *Lygus pastinace* were obtained. Two Dragon-flies, *Pyrhosoma minimum* and *Enallagma cyathigerum*, and two Lace-wings, *Hemerobius subnebulosus* and *Micromus paganus*, were also captured. At 6 o'clock tea was served by the Misses Gardiner on an open spot backed by fine beech trees, with a beautiful prospect of river and wood in front, after which the members returned to the railway station, some of them taking advantage of a kind invitation to visit Maynooth College, where they saw much that interested and pleased them. The party returned to town by the 8.45 train.

ROYAL IRISH ACADEMY.

JUNE 4th.—Mr. R. J. USSHER read a paper on the Breeding Range of Birds in Ireland. Recent inquiries have shown that the Golden Eagle still breeds in a few spots in Western Mayo, Donegal, Galway, and Kerry. A pair of White tailed Eagles had been seen in the Co. Mayo, and another pair was found in the Co. Kerry. The Peregrine Falcon also breeds in many places throughout the country, but the Common Buzzard is nearly exterminated. The Tree Sparrow was breeding in several parts of Co. Dublin, and was increasing in number. On the other hand, the Raven had become extinct in some counties, and was rare everywhere, while the Bittern is now never met with in our midst.

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NOTES ON GLACIAL DEPOSITS IN IRELAND.

BY PROFESSOR W. J. SOLLAS, F.R.S., AND R. LLOYD PRAEGER, B.E.

I.—THE BRAY RIVER.

THE progress in the discovery of the history of the last great glacial period advances like the glaciers themselves—so slowly, that a sceptic might be pardoned for doubting whether any advance is being made at all; nor, considering the extent, complication, and fragmentary nature of glacial deposits, and the number, variety, and contradictoriness of glacial theories, is this in any way surprising. Facts, and the analysis of facts appear to be even still requisite before the subject can be regarded as ripe for synthetic treatment. In the series of notes of which this is the first, we will confine ourselves to a detailed description of the deposits as they are found in some localities in Ireland where we have had an opportunity of studying them, drawing only immediate inferences, and leaving generalization to a later period.

An account has already¹ been given of the succession and character of the glacial deposits as seen in the fine section on the shore between Bray and Killiney; we will now trace their extension inland, availing ourselves of the numerous sections which occur on both sides of the Bray River.

The Bray River, which flows eastward into the Irish Sea some ten miles south of Dublin, is formed by the confluence of the Dargle and Cookstown Rivers, which are made up of numerous tributaries, having their sources among the granite hills (1,000–2,000 feet) of the Leinster chain. Descending from the granite, these feeders flow over Ordovician slates, and micaceous and other schists produced by contact alteration of the slates. The Bray River itself flows chiefly over Cambrian rocks, down a wide valley thickly filled with drift, through which the stream has cut a deep channel. The Carboniferous

¹ *Irish Naturalist*, Vol. III., 1894, pp. 13–18.

rocks, which extend far to the west and north, are completely excluded from its basin by the granite of the Leinster chain. (See Map, fig. 1.)

FIG. 1.



Starting from the sea, we will follow the road to Enniserry, which runs first on the northern bank of the stream, and for the latter half of its distance on the southern; and study the sections in the order in which we meet them. The first section is seen by the roadside opposite Bray Common. Here the drift presents steep faces some fifteen feet in height, and consists of sandy clay and coarse boulders confusedly intermingled, without stratification, traversed by vertical pipes filled with coarse but otherwise similar material. The stones consist of green diabase, porphyritic with felspar (Lambay porphyry¹), Leinster granite, and Carboniferous limestone, all

¹ This rock, commonly known as "Lambay porphyry," forms a large part of Lambay Island, fifteen miles N.W. of Dublin, and is common in the Ordovician rocks of Eastern Ireland; near Dublin it occurs in numerous dykes at Glennasmole.

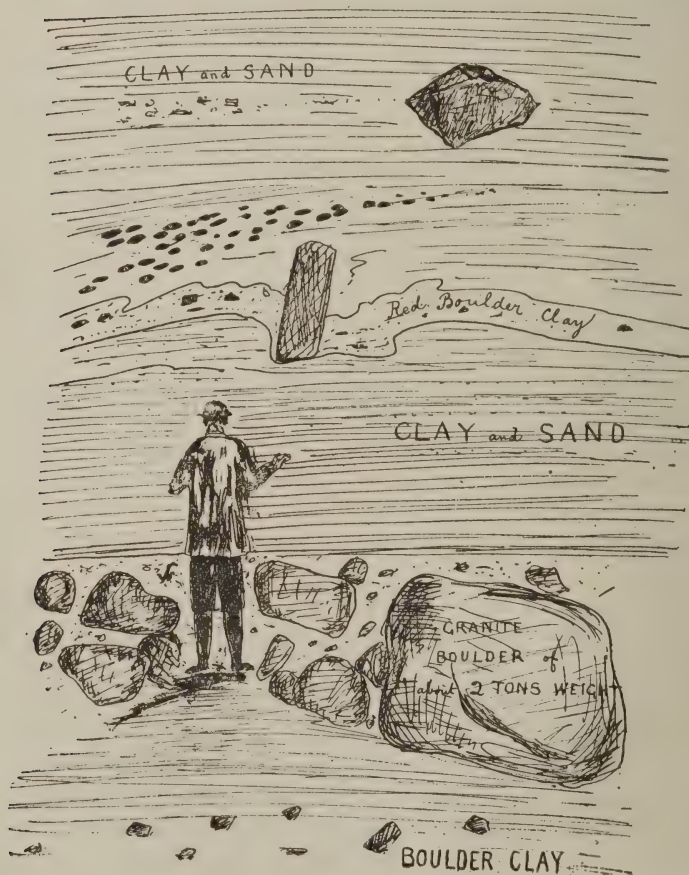
scratched, but usually very irregularly. This deposit appears to correspond to those beds on the shore which we have described under the name of "contorted drift," but which, after further study, we now propose to refer to under the general term of "boulder gravels." In the present section, as elsewhere, the boulder gravels rest on red boulder clay, containing numerous fragments of marine shells, and in all respects similar to the boulder clay on the shore. A little further on, behind some cottages, the boulder clay is seen better; it contains seams of fine red sand free from stones, though in its mass sub-angular and rounded stones of quartzite, Lambay porphyry, Ordovician schist, and Leinster granite are dispersed. Shell-fragments are not uncommon; *Tellina balthica* occurs, and pieces of an exotic *Pecten*.

A good section of the boulder gravels occurs near a cottage before reaching Vallombrosa. Here a massive deposit, twenty feet in thickness, is seen resting on boulder clay, of which some twelve feet is visible. The boulder gravels are cemented together by carbonate of lime, and stand out in a bold cliff over the road. A little further on, behind a cottage on a bye-road, another section is seen, consisting of some twenty feet of coarse, clean gravel. A census of the boulders and pebbles of the deposit gave 50 per cent. Carboniferous limestone, 30 per cent. Cambrian quartzite, 10 per cent. granite; and there were also present basalt, Lambay porphyry, Ordovician ash, flint, slate, and rhyolite, which was identified as coming from Forkill, Co. Armagh. Shell-fragments were found sparingly; *Cyprina islandica* was the only species recognisable. The deposit rests on boulder clay, and a big granite boulder was observed at the junction of the beds. Such boulders commonly occur in such a position.

Following the main road, we now cross the Bray River, and proceed up the southern bank. Opposite where the Vartry water-main crosses the stream, we see a small exposure of blue boulder clay, containing numerous shells, many of them in a nearly perfect state; *Cardium edule*, *Tellina Balthica*, and *Turritella terebra* are common, and there were also observed *Astarte borealis*, *Cardium echinatum*, and fragments of a *Mytilus* and a *Mactra*, and of several indeterminable species. It is worthy of note that the boulder clay at this point is dark blue, whereas almost everywhere else in the Bray valley it is dark

red; further observation is needed before we can speak with certainty as to the significance of these colour-changes. The top of the boulder clay is here about twenty feet above the stream, in which the bed-rock (Ordovician slate) is seen. Over the boulder clay lie forty feet of boulder gravels, containing well striated Carboniferous limestone boulders, the striæ running parallel with the long axis, in the manner characteristic of boulders striated by glaciers. Beside a steep path to a roadside cottage, a band of blue boulder clay, two feet thick, containing well striated boulders of Carboniferous

FIG. 2.



limestone, and shells of some of the species last mentioned, a few of them perfect, but only as single valves, is seen intercalated in the boulder gravels, with fine sands above and below it. The boulder gravels contain huge fragments of granite and Cambrian slate. Similar intercalations are seen elsewhere.

A little further on, at a bend of the road, a very remarkable section is seen, as shown on accompanying sketch (fig. 2). Immediately above the boulder clay are great blocks of granite, ranging up to about two tons in weight. Clays and sands succeed, and on their irregular surface lies a contorted layer of characteristic red boulder clay, eight inches thick, followed by pebble beds, sands, and clays in alternation. A little further on the boulder clay underlying this layer of great boulders is exposed for a depth of fifteen feet; it is red in colour, shell-fragments are common in it, as well as fragments of Antrim chalk, and well striated Carboniferous limestone.

FIG. 3.



Apparent folding in the Glacial Drift, Bray River, near Enniskerry.

The crests of the folds point up the river valley. Length of section about 15 feet.

A few yards further on, in a cutting made for the proposed Enniskerry railway, the section seen in figure 3 is observed; this appearance is remarkably suggestive of folding, though the inclusion in the boulder gravels of lenticular masses of

boulder clay, such as may be seen in the coast section, might possibly give rise to the same effect.

Near the road, within a stone's throw of Enniskerry, occurs by far the finest section which is to be seen in the valley, and of decidedly unusual character. Here the boulder clay, of which only the upper surface is exposed, is seen underlying about seventy feet of sands and gravels. The boulder clay contains fragments of shells as usual; it is succeeded by a curious alternation of boulder clay and gravelly beds, so that the lowest portion of the section is as follows:—

	Feet.	Ins.
Red-brown boulder clay,	1	0
Laminated sand,	1	0
Limestone gravel,	0	3
Red-brown boulder clay,	1	0
Laminated sand,	1	0
Limestone gravel,	0	6
Top of thick deposit of boulder clay.		

In the intercalated clay shell-fragments occur, and in the beds of gravel *Astarte compressa* was found, with fragments of two other shells. Attention may be called to the regular gradation from gravels through sands to boulder clay, and, as thin beds of boulder clay rest quite undisturbed on evenly laminated sands, it would be an obvious suggestion, were we dealing with any other than glacial deposits, that the whole were of aqueous origin. The section is continued upwards into varying beds of sand, frequently micaceous, some finely laminated, some false-bedded; sandy and clayey gravels, and pebble beds, composed of Carboniferous limestone and granite; the several beds varying in thickness from one inch to two feet. The whole concludes above with a massive band of brown sandy clay, full of rounded, sub-angular, and angular pebbles and boulders chiefly of Carboniferous limestone, irregularly scratched. This section contrasts strongly with the other exposures of boulder gravels in the extreme cleanliness of the sands and gravels, and the apparent total absence of shell-fragments above the last bed of boulder clay, *i.e.*, in the greater portion of the deposit.

(TO BE CONCLUDED.)

A BOTANICAL TRIP TO CO. ANTRIM.

BY W. A. SHOOLBRED, M.R.C.S., CHEPSTOW.

(Concluded from page 149.)

Lythrum salicaria, L.—I do not recollect ever before having seen this plant forming such grand masses of colour as it did last summer, especially in Glenariffe and Glendun. The flowers were brighter in colour than usual, no doubt in consequence of the unusual duration of bright sunlight.

Epilobium palustre, L.—Glenariffe, Glendun, Fair Head, Causeway, &c.

E. obscurum x palustre (Teste E. S. Marshall).—Glenariffe, Glenshesk, and Giant's Causeway.

Circoea alpina, L.—Glenariffe.

var. **intermedia** (Ehr.)—Glenariffe and Glenshesk.

Galium boreale, L.—Sparingly by the stream in the upper part of Glenariffe.

Valeriana officinalis, L.—Common, but only var. *Mikani* noticed.

Centranthus ruber, DC.—Wall near Ballycastle.

Gnaphalium sylvaticum, L.—Glenariffe, sparingly.

Chrysanthemum segetum, L.—Extremely common in tillage fields, while field poppies appear to be equally rare. In this part of the West of England *C. segetum* is a decidedly rare plant.

Matricaria inodora, L. b. **salina**, Bab.—Giant's Causeway, &c.; **c. maritima**, Linn.—Red Bay.

Arctium nemorosum, Lej.—Fair Head.

Crepis paludosa, Moench.—Glendun.

Hieracium anglicum, Fr.—Frequent on the cliffs along the coast; Fair Head, cliffs at Giant's Causeway, Co. Antrim; Benevenagh, Co. Derry.

This and *H. iricum* appear to grow more abundantly at quite low elevations in County Antrim than is usually the case in West Scotland. The plants, too, growing at these low elevations are generally very luxuriant with flower stems much branched and numerous heads of flowers. Near Garron Head, at a few feet above sea-level, some very large specimens were gathered, and near the bridge over the Cushenilt Burn one with a single much-branched flower-stem bearing forty flower-heads in all stages of development. Of this Mr. Hanbury writes "*H. anglicum*, Fr. form." These plants have a very different appearance from the ordinary two- or three-headed highland forms.

A plant from a bank by the Parkmore road on the north side of Glenariffe, of which Mr. Hanbury writes, "I think only a form of *H. anglicum* grown in a dry exposed place," looked, when gathered, very unlike this species, the root-leaves forming a close flat rosette, from almost orbicular to ovate, nearly entire, very shortly petioled, very glaucous, coriaceous, and bearing on their surface numerous stiff white hairs. No stem-leaf. Stem one-headed with a few abortive buds in the axils of linear bracts. The involucre less hairy and rather more floccose than in most forms of *anglicum*.

Another from Sallagh Braes, which Mr. Hanbury also considers a form of *anglicum*, has thin long-petioled root-leaves very deeply and acutely dentate in the lower half, teeth patent; stem-leaf none, or one narrow, sessile, and quite low down; heads one to three.

On the Giant's Causeway cliffs a form with purple-spotted leaves was found, very similar to a form seen a week or two later in Perthshire.

var. **longibracteatum**, Hanb.—Basalt cliffs on the south side of Glenariffe. Plants apparently the same, but too far advanced for identification, were gathered on Sallagh Braes and near Garron Head.

H. iricum, Fr.—Very fine on the cliffs near Garron Head. Plentiful on the cliffs and by the river in the upper part of Glenariffe.

H. bifidum, Tausch.—Basalt cliffs, Benevenagh, Co. Derry. Only three or four specimens collected and a few more seen quite out of reach. Foliage apparently of this seen on Sallagh Braes, but flowering stems quite dead.

H. euprepes, Hanb.—Boulder-clay bank by roadside near Milltown, Red Bay.

H. stenolepis, Lindeb.—Plentiful on the cliffs near Garron Head; Glenariffe cliffs, Co. Antrim. Benevenagh; Co. Derry.

H. murorum, Linn.—Glenariffe, not yet out of flower in shady places by the river; cliffs near Garron Head, &c.

H. vulgatum, Fr.—Cliffs near Garron Head; plentiful in Glenariffe and Glendun, both on the higher parts of the cliffs and by the streams.

H. Friesii, Lindeb.—Riverbanks, Glendun.

H. auratum, Fr.—In several places on the banks of the river in Glendun.

H. crocatum, Fr.—Cave Hill; boulder-clay bank near Milltown, together with *euprepes* and *vulgatum*; Glendun.

H. eupatorium, Fr.—Riverbanks, Glendun.

Hypochæris radicata, L.—A form gathered on the cliffs at Benevenagh, in foliage and habit somewhat resembling *H. maculata*.

Sonchus arvensis, L.—Remarkably finely developed plants about the bases of sea-cliffs near Giant's Causeway.

Lysimachia nemorum, L.—A luxuriant form with flowers much larger than is usual with us, was noticed in the Glens.

Erythræa centaureum, Pers., var. **capitata** (Koch.)—Sand-banks near Giant's Causeway.

Myosotis palustris, With., var. **strigulosa** (Reichb.)—Cushendun.

Euphrasia officinalis, L., var. **gracilis** (Fr.)—Between Ballyearth and Ballintoy.

Bartsia officinalis, Huds., var. **serotina** Reichb.—Giant's Causeway, &c.

Melampyrum pratense, L.—Both vars. **latifolium** and **montanum** noticed in the glens.

Rhinanthus Crista-galli, L., var. **angustifolia**—Fair Head.

Lamium Intermedium, Fr.—Fields near Giant's Causeway.

Salsola kali, L.—Red Bay.

Atriplex laciniata, L.—Red Bay.

Betula glutinosa, Fr., and var. **pubescens** (Wall.)—Glenariffe and Glendun.

Habenaria conopsea, Benth.—Fair Head.

H. albida, R. Br.—Glenariffe.

H. chloroleuca, Ridley—Glenariffe.

Scirpus setaceus, L.—Near Fair Head; between Ballycastle and Ballintoy.

Carex pliculifera, L.—Glenariffe cliffs.

C. pendula, Huds.—Glenariffe.

Sieglingia decumbens, Bernh.—Cliff bases, Glenariffe.

Festuca durluscula, L.—Glenariffe.

Agropyron acutum, R. & S.—Sandy shore, Red Bay.

A. marinum, L.—Benevenagh cliffs, Co. Derry.

Cystopteris fragilis, Bernh.—Sparingly on Benevenagh cliffs.

Polystichum lobatum, Presl and var. **aculeatum** Syme.—Glenariffe and Glendun.

Lastrea Filix-mas, L.—Some enormous specimens noticed in Glenariffe with fronds nearly five feet in length.

Botrychium Lunaria, Sw.—There was not a frond of this to be seen at Cushendun on the sandy ground near the shore where Mr. Brenan told me it can usually be found in hundreds. The long drought had probably shortened the season of growth for this as well as for so many other herbaceous plants.

HYDROIDS AND POLYZOA COLLECTED BETWEEN LAYTOWN AND THE MOUTH OF THE BOYNE.

BY J. E. DUERDEN, A.R.C.SC. (LOND.)

THE material upon which the following report is based, was collected along the shore from Laytown to the mouth of the River Boyne, a distance of about three miles, on the occasion of the visit of the Dublin Naturalists' Field Club on the 16th June, 1894. Except at the mouth of the Boyne the shore is one stretch of sand, there being none of the rock-pools which generally reward the collector of zoophytes so liberally. In all twenty-three species of Hydroids and twenty species of Polyzoa were obtained, which had been washed up from more or less considerable depths. Two of the Hydroids, *Gonothyræa hyalina*, Hincks, and *Sertularia gracilis*, Hassall, are new to Ireland. Of the former a fine colony was found growing profusely on *Zostera*, and exhibiting the characteristic irregularly ovate gonothecæ. It is a rather rare hydroid, and is mentioned by Mr. Hincks (Brit. Hyd. Zooph., p. 185) only from Shetland, amongst British localities. *Sertularia gracilis* is closely allied to the very common *S. pumila*, Linn., but is much more delicate in all its parts, and is not exclusively littoral.

Diphasia attenuata, Hincks, and *Plumularia similis*, Hincks, were collected. They are rather rare forms, each having been previously recorded from only two Irish localities.

At the mouth of the Boyne a few rock-pools are found, and the water is slightly brackish. *Obelia gelatinosa*, Pallas, was obtained, and *Campanularia flexuosa*, Hincks, was abundant on the under side of the stones.

Amongst the Polyzoa *Cellepora avicularis* Hincks, was obtained in great abundance encrusting *Hydrallmania falcata*, Linn., and other zoophytes. So far this species has been recorded in Ireland only from the coast of Antrim, but, as Hincks says, it has probably been passed over from its superficial resemblance to the common *Cellepora pumicosa*, Linn.

As no collections have ever been previously recorded from this district I give below the entire list of those obtained.

HYDROIDS.

Eudendrium ramosum, Linn. *Clytia johnstoni*, Alder. *Obelia geniculata*, Linn. *Obelia gelatinosa*, Pallas. *Obelia dichotoma*, Linn. *Campanularia volubilis*, Linn. *Campanularia verticillata*, Linn. *Campanularia flexuosa*, Hincks. *Gonothyrea hyalina*, Hincks, new to Ireland. *Lafæa dumosa*, Flem. *Calycella syringa*, Linn. *Coppinia arcta*, Dalyell. *Halecium Bearii*, Johnston. *Sertularella polyzonias*, Linn. *Diphasia attenuata*, Hincks. *Sertularia gracilis*, Hass., new to Ireland. *Sertularia operculata*, Linn. *Sertularia abietina*, Linn. *Sertularia argentea*, Ell. and Sol. *Hydrallmania falcata*, Linn. *Antennularia ramosa*, Linn. *Aglaophenia pluma*, Linn. *Plumularia similis*, Hincks.

POLYZOA.

Eucratea chelata, Linn. *Gemellaria loricata*, Linn. *Scrupocellaria reptans*, Linn. *Scrupocellaria scruposa*, Linn., very abundant on *Fucus*. *Cellaria sinuosa*, Hass. *Membranipora pilosa*, Pall. *Membranipora membranacea*, Linn. *Schizoporella hyalina*, Linn. *Cellepora pumicosa*, Linn. *Cellepora avicularis*, Hincks. *Crisia eburnea*, Linn., with abundant ovicells. *Crisia aculeata*, Hass. *Tubulipora flabellaris*, Fabr. *Idmonea serpens*, Linn. *Lichenopora hispida*, Flem. *Alcyonidium parasiticum*, Flem. *Vesicularia spinosa*, Linn. *Amathia lendigera*, Linn. *Bowerbankia imbricata*, Johnst. *Valkeria uva*, Linn.

INSECTS COLLECTED BY THE ROYAL IRISH ACADEMY FLORA AND FAUNA COMMITTEE,

1893.

BY REV. W. F. JOHNSON, M.A., F.E.S., J. N. HALBERT, and
GEORGE H. CARPENTER, B.SC.

COLEOPTERA.

(Concluded from page 155.)

CHRYSOSELIDÆ.

Donacia discolor, Panz.—Berehaven; Bere Island; Hungry Hill. The only other record for Ireland is Ardara, Co. Donegal, but specimens have been obtained (besides the localities just mentioned) at Killarney (July, 1892), Leixlip, and the Royal Canal, near Dublin. We doubt, however, if this form should be considered distinct from *D. sericeus*.

Lema lichenis, Voet.—Cavan, common in moss on trees.

Chrysomela Banksi, F.—Coolmore.

C. staphylea, L.—Cavan, common.

C. hyperici, Forst.—Near Ballyhaise, in moss.

Gastroldea viridula, De G.—Shores of Lough Oughter, sweeping nettles.

G. polygoni, L.—Greenore, common in a meadow.

Phædon tumidulus, Germ.—Dundalk.

P. armoraciæ, L.—Coolmore.

Prasocuris junci, Brahm.—Dundalk.

Lochmæa capreæ, L.—Hungry Hill. New to the south-west of Ireland.

L. suturalis, Thoms.—Fathom, off conifers. Shores of Lough Oughter.

Galerucella lineola, F.—Berehaven, new to S. W. Ireland.

Adimonla tanacetii, L.—Coolmore, great numbers washed on the beach after a very hot day.

Longitarsus ater, F.—Ballyhaise.

L. luridus, Scop.—Cavan, common.

***L. suturellus**, Duft., var. **fuscicollis**, Steph.—Cultragh Lough.

L. melanocephalus, All.—Coolmore. Cavan, common.

***L. distinguendus**, Rye.—Coolmore.

L. jacobææ, Wat.—Coolmore. Cavan, common.

L. gracilis, Kuts.—Coolmore. Cultragh Lough.

Haltica ericeti, All.—Shores of Lough Oughter, one specimen by sweeping in a birch plantation. A new species to the North of Ireland. The only other Irish locality recorded is Waterford.

Phyllotreta undulata, Kuts.—Coolmore. Cavan, common.

Sphæroderma cardui, Gyll.—Coolmore.

Crepidodera transversa, Marsh. } Coolmore. Dundalk.

C. ferruginea, Scop. }

C. ventralis, Ill.—Coolmore.

Plectroscelis concinna, Marsh.—Cavan, common.

Psylliodes chrysocephala, L.—Ballyhaise.

P. napi, Koch.—Banks of River Erne near Ballyshannon. Ballyhaise.

Cassida viridis, F.—Dundalk.

MORDELLIDÆ.

Anaspis frontalis, L.—Fathom.

CURCULIONIDÆ.

Aplon subulatum, Kirby.—Ballyhaise.

A. cruentatum, Welt.—Woods near Cultragh Lough.

A. rufirostre, F.—Coolmore.

A. vicinæ, Payk.

A. apricans, Herbst. } Coolmore. Cavan, common.

A. bohemani, Thoms. }

A. dichroum, Bedel.—Woods near Cultragh Lough.

A. carduorum, Kirby.—Shores of Lough Oughter.

A. virens, Herbst.—Coolmore. Cavan, common.

A. ervi, Kirby.—Cavan, common.

A. vorax, Herbst.—Coolmore.

A. Gyllenhalli, Kirby.—Coolmore. Cavan, common.

A. seniculum, Kirby.—Carlingford. The only other Irish locality recorded is Waterford.

- ***Aplon marchicum**, Herbst.—One specimen at Cultragh Lough.
A. humile, Germ.—Coolmore.
Otiorrhynchus atroapterus, De G.—Coolmore.
O. maurus, Gyll.—Carlingford.
O. ligneus, Ol.—Coolmore.
O. picipes, F.—Carlingford. Fathom. Berehaven.
O. sulcatus, F.—Coolmore. Fathom. Berehaven. Dursey.
O. rugifrons, Gyll.—Coolmore.
Strophosomus coryli, F.—Cavan. Berehaven.
Lophlæus nubilus, F.—Berehaven.
Barynotus Schönherri, Zett.—Coolmore. Slieve Gullion.
Alolphus trigguttatus, F.—Coolmore.
 ***Sitones cambricus**, Steph.—Shores of Lough Oughter, sweeping *Phragmites* at water's edge.
S. regensteiniensis, Herbst.—Cavan, common. Dundalk.
S. tibialis, Herbst.—Coolmore. Cavan.
S. hispidulus, F.—Cavan.
S. flavescens, Marsh.—Coolmore. Lough Oughter. Slieve Glah.
S. sulcifrons, Thunb.—Coolmore. Cavan.
Hypera polygoni, L.—Greenore. Dundalk.
H. plantaginis, De G.—Coolmore.
H. nigrirostris, F.—Slieve Gullion.
Hylobius abletis, L.—Berehaven.
Orchestes fagi, L.—Cavan, common.
Rhamphus flavicornis, Clairv.—Coolmore.
Erirrhinus scirpi, F.—Coolmore, not common. Lough Oughter, very local, several specimens on a patch of *Scirpus* on the shore.
E. acridulus, L.—Dundalk.
Meclnus pyraister, Herbst. }
Anthonomus pedicularius, L. } Coolmore.
Nanophyes lythri, F.—Coolmore, on *Lythrum salicaria*.
Cœllodes quadrimaculatus, L.—Coolmore. Dundalk. Cavan, very common.
Ceuthorrhynchus erysimi, F.—Woods near Cultragh Lough.
C. contractus, Marsh.—Coolmore.
C. pollinarius, Forst.—Coolmore. Cavan, common.
C. litura, F.—Coolmore, abundant on thistles. Mr. Halbert has taken it at several localities in Co. Dublin, but does not seem to have recorded the capture.
Rhopalomesites Tardyl, Curt.—Coolmore. Bantry. Killarney.
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THE SEAGULL BOG, TULLAMORE.

BY R. LLOYD PRAEGER, B.E.

By the kindness of the Rev. Canon Russell, of Geashill Rectory, I had recently an opportunity of visiting a portion of the Bog of Allen, including that bog, a few miles south of Tullamore, which is celebrated as being one of the greatest breeding-haunts of the Black-headed Gull (*Larus ridibundus*, L.) in Ireland—if, indeed, it is not *the* greatest. A morning train on June 23rd speedily brought me to Geashill station, and a rapid drive to the rectory, along a pine-fringed road, with bog stretching away on either hand, only left time to note the Bog Thistle (*Carduus pratensis*) filling a meadow by the railway between Portarlington and Geashill, and the Rough Hawksbeard (*Crepis biennis*) growing in abundance in the meadow around the school-house in the little village; I was informed that it has been abundant in this meadow for some years. This plant, probably in all cases originally introduced with grass-seed, appears to be spreading in Ireland; but it is still local and rare. The forenoon was spent in Canon Russell's company in exploring the bog lying between the rectory and the railway. On the way thither I was pointed out a meadow which is the only local habitat of the Bee Orchis (*Ophrys apifera*), and here we obtained good specimens in full blossom. Out on the bog the Marsh Andromeda (*A. polifolia*) was abundant, as I was told it is on all the neighbouring bogs, but its pretty pink bells were all already fallen; in the wetter portions, especially on the margins of pools, the beautiful little Cranberry (*Vaccinium Oxycoccus*) was in full blossom, and the great tufts of soft green *Sphagnum*, covered with a network of its wiry little stems with reflexed white-backed leaves, and dotted all over with its pink flowers, were indeed a sight to see. Here also grew two of the Sundews (*Drosera anglica* and *D. rotundifolia*), and other bog plants. On our return to the rectory *Arenaria trinervia* was observed growing close to the house. Early in the afternoon we started for the "Seagull Bog," a pleasant drive of some miles along roads with great hedges filled with the Dog Rose and Trailing Rose (*R. arvensis*) and Honeysuckle and Guelder Rose in great abundance. In more than one spot I observed the Alder Buckthorn (*Rhamnus Frangula*) which Canon Russell had

previously found in other hedges in the district. Arrived at the edge of the bog we were joined by Mr. Digby, J.P., agent to his cousin, Lord Digby, the owner of the estate, under whose care the "gulleries" are carefully preserved, and have in consequence enormously increased in size of late years—a wise as well as humane act of protection, for these birds are of great service to the farmer, and destroy hundreds of grubs and worms, and their appearance should be welcomed by the agriculturist everywhere. Our party having been reinforced by several ladies, we passed through a couple of fields to where the bog rose in front of us. I use the word "rose" advisedly, for, like many of the larger Irish bogs, it rises, at first quite suddenly, and then in a long smooth ascent, from the margin to the centre, a distance of over half a mile. It is in the central portion, where the bog is intersected by a maze of pools and dangerous quagmires, that the gulls have made their great colonies, and thither we were piloted under the skilful guidance of Mr. Digby, who appeared acquainted with every pool and tuft of heather of the whole region. This pilotage was indeed necessary, for danger lurks in the bewildering network of water and soft moss that stretches on every hand, and ere we left, several of our party had learned, by little bits of personal experience more surprising than pleasant, the reason why this bog is feared even by the hardy and experienced cottagers around its margins.

We were of course too late to see the eggs of the Black-heads, and already the majority of the young birds were able to fly; but as we advanced into the centre of the breeding-ground, and as hundreds upon hundreds of gulls rose as we cautiously wended our way onward, we saw dozens of deserted nests, and soon came on plenty of young birds running like rats among the rushes and grass, or skulking in corners of the pools; while all the time continued the musical din caused by the cries of hundreds of gulls. To watch the myriads of graceful birds eddying overhead, and to listen to the wonderful clamour, was most interesting; but, on botanical things intent, what struck me most was the curious and abrupt change in the character of the vegetation on those portions of the bog which the gulls had selected as breeding-haunts. Outside of this area the usual bog-flora reigned—Ling (*Calluna vulgaris*), Bog Heather (*Erica tetralix*), *Scirpus cespitosus* and

Sphagnum making up the bulk of the vegetation, assisted by Andromeda, Cranberry, Cotton-grass, and the two Sundews previously mentioned. But where the gulls have settled an abrupt change is noticeable. All the above plants disappear, and they are replaced by dense and luxuriant beds of rushes (*J. effusus* and *J. acutiflorus*), Sorrel (*Rumex acetosa*), and Soft-grass (*Holcus lanatus*), among which grow many plants which do not normally affect the centre of an extensive and very wet bog, such as the Chickweed (*Stellaria media*), Heath Groundsel (*Senecio sylvaticus*), Rape (*Brassica Napus*), Creeping Crowfoot (*Ranunculus repens*), Pearlwort (*Sagina procumbens*), Broad-leaved Mouse-ear (*Cerastium glomeratum*), Small-flowered Willow-herb (*Epilobium parviflorum*), and so on. That the original flora is killed off by the continued trampling, and by the accumulation of guano, there can be no doubt; while other stronger plants which love wet manured ground, and others again whose seeds have been eaten by the birds, spring up to take their place. It was late in the afternoon ere we again reached the edge of the bog, and drove back to the hospitable rectory at Geashill, where a few botanical notes were gleaned from Canon Russell and his sisters, such as the occurrence of the Toothwort (*Lathræa squamaria*) in some abundance not far off, and of the Columbine (*Aquilegia vulgaris*) in Clonad Wood, where it is thoroughly naturalized, if not native; I was shown specimens of the Fly Orchis (*Ophrys muscifera*) collected in the county. An evening drive to the station, and a couple of hours train journey in pleasant company, completed a most interesting day, made doubly enjoyable by the kindly hospitality that was extended to me.

NOTES.

ZOOLOGY.

INSECTS

Dellephila livornica In Co. Meath.—On Sunday, June 10th, 1894, about 9.45 p.m., I took on the wing, near a clump of rocket plants in bloom, in the garden of Riverston, Trim, Co. Meath, a fine fresh specimen of this handsome hawk-moth. The insect was flying with the wind, which was blowing pretty sharply from about north-north-east.—LOUISA E. CUPPAGE, Riverston, Trim.

[It appears from the catalogue of the Lepidoptera of Ireland by Mr. W. F. de Vismes Kane, now being published in *The Entomologist*, that there are records of captures of this insect on six or seven previous occasions in Ireland. The number of specimens taken before the present are amounting in all to twelve—i.e., two at Youghal, two at Ennis, and

one at Kilkenny (dates not given), four at Killarney in 1864, and one at Kingstown, and two near Belfast in 1888. The Dublin Museum possesses a specimen labelled "Kildare, Douglas, 1869." It is to be observed that the year 1888, like the present year, followed an unusually hot dry season.—E.DS.]

Bupalus piniaria and Eupithecia togata In co. Meath.—This week, when beating for moths in Mr. Winter's charming bog wood, Agher, Co. Meath, I had the pleasure of capturing some specimens of *Bupalus piniaria*, a rare and local species in Ireland. At the same time and place I took two fine and fresh specimens of *Eupithecia togata*.—HARRIETTE E. REYNELL, Dublin.

Cimbex connata, Schr., on Valentia.—A female of this scarce and handsome sawfly has been kindly forwarded to the Dublin Museum by Miss Delap.

Mr. J. J. Dowling has taken two male Cimbices of extraordinary size at Stillorgan, Co. Dublin. I am not yet satisfied if they are also *C. connata*; they may prove to be an American species.—GEO. H. CARPENTER.

Micralymma brevipenne, Gyll., at Mornington, Co. Meath.—It was my good fortune to be present at the recent joint excursion of the Dublin and Belfast Field Clubs to the district south of the Boyne mouth; quite a number of good species were taken. Of special interest to me was *Micralymma brevipenne*, Gyll., which I obtained in some numbers under stones where a small streamlet flows into the Boyne near Mornington. I had also taken it in the Dingle district earlier in the month. Little is known about the occurrence of this species in Ireland; there is no Irish locality given in Canon Fowler's recent work on the British Coleoptera, but on making search I find that there are specimens in the Haliday collection from Strangford Lough, and he also recorded it from the Creek of the Owenbeg River, Co. Cork.—J. N. HALBERT, Dublin.

MOLLUSCA.

The Common Mussel (*Mytilus edulis*).—Mr. R. Lloyd Patterson's mention of the mussel industry in Belfast Lough, and the fact that they had shifted their quarters, reminds me that last year I noticed a sudden increase of young mussels on the shore about Macedon Point, where many square yards of ground are thickly covered with them, and this year, for the first time in my memory, boats have been fishing for them with long rakes as he describes, and a donkey cart and hand-carts have been gathering those close to the shore.—SYDNEY M. THOMPSON, Belfast.

BIRDS.

Redstart (*Ruticilla phoenicurus*), breeding in Co. Tyrone.—On the 16th June inst., I visited Barons Court, the extensive and beautifully wooded demesne of the Duke of Abercorn, where an abundance of fine old timber covers the hill slopes. In reply to my enquiries as to the birds to be found there, Mr. James Maclean, the under-keeper, stated that Redstarts had bred there three years in succession since he came to the place, and he showed me holes in trees in which they had nested. He then showed me the male and female Redstarts and found their nest of this year containing three young just ready to fly, and three eggs that had not hatched out. A fourth young Redstart that had left the nest was caught, and is now in the Science and Art Museum. The nest was in the hole of a broken branch of a large old birch. The parent Redstarts remained near when we were inspecting it, uttering their alarm-cry like the "twit" of a Willow Warbler, but much louder. The male was a splendid bird, forehead white, face and throat black, back bluish grey, breast and tail bright orange.

The Rev. G. W. Peacocke informs me that on the 26th and 29th May, 1888, he saw and heard a male Redstart which he found frequenting Rash

Wood in Co. Tyrone. He accurately described the bird, with which he was acquainted in England previously.

Hitherto the Redstart has only been recorded since 1885 as breeding in Ireland at Powerscourt, so that these discoveries of it, both in the same part of the Co. Tyrone, are unexpected.—R. J. USSHER, Cappagh.

Blackcap (*Sylvia atricapilla*) in Co. Meath.—The Blackcap is not mentioned as nesting in County Meath in the table of "Irish Breeding Birds," compiled recently by Mr. Ussher, and I am not aware that it has been elsewhere recorded as occurring in Meath; but there can be little doubt of its nesting in the county when it is found there in full song on such a date as June 22nd. On that day I heard two different birds of this species in full song in the woods of Slane Castle demesne, and another in the woods of Beauparc. All three were within a mile of each other.—J. E. PALMER, Dublin.

Birds at Cushendun, Co. Antrim.—I have to record the capture of a young white Rook, at Cushendun, in May. The Spring Migrants appeared as follows:—Swallows on April 1st, the Cuckoo on the 7th, and the Corncrake on the 16th.—S. A. BRENAN, Knocknacarry, County Antrim.

The Quail (*Coturnix communis*) in Co. Wexford.—With reference to some notes which appeared in the *Irish Naturalist* about this time last year anent the Quail, I beg to say that I listened for some time to a Quail calling in this county on the 20th July. I have not had a nest for over 30 years.—W. MACMILLAN,

PROCEEDINGS OF IRISH SOCIETIES.

MUSEUMS ASSOCIATION.

This young but important body selected Dublin as the place for its fifth annual meeting, and over thirty delegates and associates from England and Scotland attended the gathering held here during the last week in June. Much interest was taken by the scientific public of Dublin in the meeting, and the number of local members equalled that of the visitors from across the Channel. Dr. V. BALL, C.B., F.R.S., Director of the Science and Art Museum, was president. Naturally the staff of that Institution were well represented at the meetings, and Mr. S. A. Stewart, the veteran curator of the Belfast Museum, was also present. Even America was represented by Dr. Talmage of Salt Lake City. Dr. Scharff and Mr. Longfield acted as local secretaries and spared no pains to make the meeting successful and pleasant.

JUNE 26th.—On the morning of this day the English and Scotch members arrived in Dublin. In the afternoon visits were paid to the Botanic and Zoological Gardens, tea being provided at the latter. The party were shown round the gardens and glass-houses at Glasnevin by Mr. F. W. Moore; the orchid-houses and the Killarney-fern house specially pleased the visitors. At Phoenix Park, Dr. Gordon, President of the Royal Zoological Society, received the members and conducted them to the various houses; the Orang and Chimpanzee, and the splendid collection of large carnivora were much admired.

In the evening, the meeting was formally opened in the house of the Royal Irish Academy, when Dr. BALL delivered his presidential address. This discourse on the Museums of Dublin is printed in full in *Natural Science* for July. In it, Dr. Ball traces the history of the various bodies in Dublin which have acquired collections, and shows how the majority of these, entirely or in part, have contributed to the formation of the national institution in Kildare-street. Special attention is naturally directed to the splendid collection of Irish antiquities formed by the

Royal Irish Academy, and to the natural history and other specimens in the old Museum of the Royal Dublin Society. The history of the steps leading to the transfer of these to the Science and Art Department in 1877 is traced at length, and the main points in the development of the Museum up to the present day are sketched, the removal of the art collections to the new buildings in 1890 being specially dwelt upon.

A vote of thanks to Dr. Ball for his address was moved by the LORD MAYOR, and seconded by Dr. INGRAM, the latter expressing a hope that the visitors might both receive and impart information during their stay in Dublin. The Lord Mayor then invited the members to spend an hour at the Mansion House, which they did with much pleasure.

JUNE 27th.—The reading of papers commenced at Leinster House. Mr. W. B. PEARSALL, F.R.C.S.I., described a "New Method of mounting and arranging Dental Specimens and Casts." A tooth is cemented to a fine wire inserted in the stopper of a glass tube, so that it can be readily inspected from all sides. In the discussion which followed, the opinion was expressed that this mounting would be suitable for such natural history objects as small shells.

Mr. H. B. WHITE, M.A., gave "A Description of certain of the Fittings and Appliances in use in the Science and Art Museum, Dublin," comprising the cases and systems of shelving in the various departments. Special attention was drawn to Mr. De Sales' patent hinge by means of which two doors can be hung back to back without an intermediate style.

Mr. F. W. RUDLER, F.G.S., read a paper "On the Arrangement of a Mineral Collection." He suggested that, in a small museum, the minerals are better arranged by their bases, so as to bring together the ores of the same metal, than by their acid constituents in accordance with the most recent scientific classification; the arrangement by bases being more useful to miners and practical men. Where there is a large collection, scientifically arranged, there should be subsidiary series, illustrating metallic ores, precious stones, &c. This paper led to an interesting discussion, some of the members advocating a strictly scientific arrangement, while others thought (with Mr. Rudler) that the popular and practical applications of the subject should receive most attention.

Mr. J. PATON, F.L.S., of Kelvingrove Museum, Glasgow, gave a suggestive and humorous paper upon "The Education of a Curator." He contrasted the old with the modern idea of a museum, and pointed out with many illustrations how the curator of the present day is expected to be an adept in all arts and sciences. His comparison of the modern specialist to "an unicellular organism" specially amused the meeting. He advocated a system of apprenticeship in museum work for which preparation should be made by a sound general education, specially in English, modern languages, drawing, and natural and physical science.

Mr. G. H. CARPENTER gave an account of the "Collections to illustrate the Evolution and Geographical Distribution of Animals," which he has arranged in the Dublin Museum. The geographical collection is to be found along the south and west walls of the ground floor of the Natural History building and illustrates by means of characteristic specimens, maps, and descriptive labels, the general principles of distribution, and the fauna of the six zoological regions of Sclater and Wallace. The series to illustrate evolution is arranged in a wall case at the eastern end of the same room, and shows by specimens, diagrams, and labels some of the main facts of animal life and structure which have led naturalists to belief in the doctrine of descent.

A paper by Mr. J. M. CAMPBELL, of Glasgow, on co-operative collecting was read by Mr. Paton. The author suggested that a number of museums should club together to support a collector, and divide the results of his work. In the discussion which followed, the opinion that

the division of the spoils would not be amicable, was put forth by several; and a medium for advertising duplicates available for exchange was strongly advocated.

In the early part of the afternoon visits were paid to the National Gallery, and the museums of the Royal College of Surgeons and Royal College of Science, the officers and professors of each institution conducting the members through the rooms, and explaining the exhibits. Later, the party gathered at Leinster House, where they were received by Dr. Ball, who conducted them round the Science and Art Museum. In the evening the Association dinner was held at Jury's Hotel.

JUNE 28th.—This day was devoted to an excursion into County Wicklow. The party took train to Bray, and drove to the Dargle, through which they walked. Mounting the cars again, they were driven to Powerscourt, where, by kind permission of the Viscount, the house and grounds were viewed and much admired. Lunch was then provided at Enniskerry, after which the party drove to the Waterfall, returning in the evening by the Rocky Valley to Bray. Most of the members then returned to town, but several remained for tea, and a walk round the Head, where the Cambrian and Drift beds were examined and some specimens of *Oldhamia* obtained.

JUNE 29th.—The reading and discussion of papers were resumed. Mr. W. E. HOYLE, M.A., of the Manchester Museum, read a paper "On Desk-cases illustrating the Foraminifera, and the classification of Bivalve Mollusca," in that institution, showing by means of lantern slides the arrangement of the cases and their contents. The case of Foraminifera contains specimens and magnified models and drawings of those minute and interesting creatures. Descriptive labels are largely used, and explain the general structure of the animals and their classification. At the end of the series, a selection of specimens and maps shows the importance of the shells of these animals in forming submarine deposits.

The case of Bivalve Mollusca described is arranged so as to contrast the classification of Pelsener (founded on the gills), with that of Grobben (founded on the hinge-teeth). Shells are arranged in series so as to show the supposed genetic relationships, and the difference between the two systems of classification is shown by different dividing lines.

A paper by Mr. B. H. MULLEN, M.A., of Peel Park Museum, Salford, on Museums and Ratepayers, was read by Mr. Platnauer. This contribution advocated the liberal support of museums by town authorities, specially urging that curators should be relieved, as far as possible, of merely routine and mechanical work.

Mr. HOYLE, and his assistant at Manchester, Mr. T. H. BOLTON, gave a paper entitled "Classified Cataloguing as applied to Palæozoic Fossils." The system, applicable to all natural history specimens, indicates each species by a symbol made up of a combination of letters from four alphabets (aaaa to zzzz). By this means a far larger number of species can be registered than by the means of numerals, unless an inconveniently long series of digits be used. The system will be recognized as a modification of the well known decimal system of numerals now used in many library catalogues.

Mr. T. H. BOLTON contributed a "Supplementary List of Type Fossils in the Manchester Museum."

Mr. H. O. FORBES, of Liverpool, read a paper on "The Centralisation of Types." Commenting on the inconvenience of naturalists having to travel about the country to see the various type specimens of any group at which they might be working, he urged that all type specimens in the British Isles should be collected at London, Edinburgh, and Dublin, and expressed his opinion that specimens of general interest might readily be got in exchange from the National Museums in those cities, which would compensate the local museums for parting with their types. This paper led to a very interesting discussion. Professor

J. W. CARR, of Nottingham, expressed his entire agreement with Mr. Forbes' views, and his own willingness to resign the types under his care to the British Museum. But as curators were not the owners of the specimens, he feared the realisation of the plan to be impossible, as the local authorities would not consent to give up their most cherished specimens. Mr. PLATNAUER, of York, hoped that in time, authorities might be educated up to such self-sacrifice, but contended that many advantages accrued from the present system. The specialist, in a visit to a local museum, sees many interesting specimens which he might otherwise miss, while his experience is of great value to the local curator. Mr. F. A. BATHER, of the British Museum, thought that type specimens should be preserved in the localities where found; he objected to have to go to America to see types from Germany, or to St. Petersburg to inspect types from the British Isles.

Mr. F. A. BATHER, M.A., read some "Notes on Travel," describing museums he had seen in South Africa, Australia, and New Zealand, and pointing out features in their arrangement worth imitating or avoiding.

PROFESSOR T. JOHNSON, D.Sc., gave a paper on "The Functions of a Botanical Museum," advocating that collections should be formed to assist students in the study of various groups of plants, and that special attention, particularly in Ireland, required to be paid to agriculture, horticulture, and other practical applications of botany.

A short business meeting followed, at which Edinburgh was fixed as the place of meeting for 1895, and the Lord Provost of that city was elected President.

In the afternoon Trinity College was visited. The members were met by the Librarian and Professors, and conducted over the Library, and the geological, zoological, and anatomical museums. The ancient illuminated books and other treasures of the Library much interested the visitors, who also paid special attention to the anthropometric laboratory. At the close of so well-occupied a meeting, however, it was no wonder that some were observed to turn aside to watch the cricket match in the College Park!

ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a Long-eared Owl from A. R. C. Newburgh, Esq.; a St. Kilda Sheep from Dr. A. Finegan; and a Wood-Pigeon from W. W. Despard, Esq.

10,580 persons visited the gardens in June.

BELFAST NATURALISTS' FIELD CLUB.

JUNE 30th.—Half-day excursion to Scrabo Hill. A party numbering over eighty assembled at Linen Hall at 2.30, and drove via Dundonald to Scrabo Hill, where the quarries of Triassic sandstone intersected with dykes and the overlying deposit of boulder clay were studied. Tea was subsequently provided at the Ulster Hotel, and the party reached Belfast at a late hour.

BELFAST AND DUBLIN NATURALISTS' FIELD CLUBS.

JUNE 16th.—An interesting joint excursion was held on this date, when a party of forty-five Dublin members proceeded northward by the 9.0 train from Amiens Street, which was stopped at Laytown, to allow the members to alight, by the courtesy of the superintendent of the line. A party of some fifty members of the Belfast Naturalists' Field Club and

thirty-five members of the North Staffordshire Field Club came from Belfast by the 7.0 a.m. train, and while the majority of the party elected to alight at Drogheda and spend the day in studying the interesting pagan cemetery of New Grange, others proceeded by rail to Laytown and joined the Dublin Naturalists. No time was lost in proceeding to the shore, where a cool breeze was coming in off the sea. The route lay northward to the mouth of the Boyne, along a glorious sandy beach backed by low dunes, and the members found ample scope for their various tastes. The botanists of the party were pleased to find, among other plants, the One-glumed Fescue Grass (*Festuca uniglumis*), Green-winged Orchis (*Orchis Morio*), Portland Spurge (*Euphorbia portlandica*), Sea Spurge (*E. Paralias*), Houndstongue *Cynoglossum officinale*, Sea-holly (*Eryngium maritimum*), Viper's Bugloss (*Echium vulgare*), and Common Bugloss (*Lycopsis arvensis*). Others collected fungi. Mr. J. E. Duerden made good finds among the hydroids and polyzoa thrown upon the beach by the tide; a separate note on these groups will be found on p. 169. At the mouth of the Boyne, the three light-houses and the picturesque form of Maiden Tower engaged attention, and the walk was resumed to the village of Mornington; on this part of their journey the botanists found the Hen-bane (*Hyoscyamus niger*), Lesser Broom-rape (*Orobancha minor*), the Sea Worm-wood (*Artemisia maritima*), Sea Purslane (*Obione portulacoides*), and other commoner species.

The entomologists found much to interest them. As will be seen from the following list very good work was done amongst the Coleoptera; the more important species taken are as follows—*Brosicus cephalotes*; *Badister bipustulatus*; *Harpalus tardus*, taken by Mr. Carpenter, is a local insect, having been recorded from only two or three localities in Ireland; *H. anxius*, Mr. Standen took an example on the sand-hills, we are not aware of its having been previously recorded for Ireland; *Dichrotrichus pubescens* and *Pogonus chalcus* on the shore near Mornington; *Bembidium decorum* and *B. atrocaeruleum*; *Amara trivialis*; *Calathus flavipes*; *Demetrias atricapillus*; *Cercyon littoralis*, *C. flavipes*; *Philonthus longicornis*, one specimen taken by Mr. Halbert on the sandhills; *Stenus tarsalis*; *Micralymma brevipenne*, several under stones on the shore near Mornington; *Saprinus maritimus*, taken by Mr. Cuthbert; *Coccinella xi-punctata*, the larvæ swarmed on the sand-hills; *Halysia xxi-punctata*; *Rhizobius litura*; *Byrrhus dorsalis*; *Cytilus varius*; *Simplocaria semistriata*; *Pityophagus ferrugineus*; *Dascillus cervinus*; *Helodes minuta*; *Telephorus nigricans*, var. *discoloris*; *Ockina hedere*, *Lacon murinus*; *Rhagium indagator*, Mr. Standen was very fortunate in taking a specimen of this rarity off the Jessamine growing near the farmhouse at the beginning of the Boyne sandhills, it had probably emerged from some split logs which he saw lying on the shore embankment, evidently intended for fencing purposes, this handsome Longicorn appears not to have been previously taken in Ireland, but it is to be feared the logs may have been imported. *Phadon tumidulus*; *Heliopathes gibbus* occurred under stones in the sand-hills near Boyne mouth; *Apion hydrolapathi*, *Gyllenhalii*, *radiolus*, etc. *Otiorrhynchus maurus*; *Hypera punctata*; *Anthrenomus rubi*; *Grypidius equiseti*; *Cassida viridis*. Mr. H. K. G. Cuthbert obtained several fine species of hymenoptera on the sand-hills, including *Crabro peltarius*. Dr. Scharff found several specimens of *Metoponorthus pruinosus*, Br., under a stone near the mouth of the Boyne. This rare woodlouse has not been found in Ireland for many years; its only known locality here is near Dublin, where the late Dr. Kinahan took it. The characteristic snail of the district, *Helix pisana*, was observed in abundance.

At Mornington cars were in waiting to convey the party to the Whitworth Hall, Drogheda, which was kindly placed at their disposal by Mr. James H. Cooke, J.P. Here they were joined by a large party of the Belfast and North Staffordshire members, who under the able guidance of Mr. George Coffey, M.R.I.A., had spent a profitable day at New Grange.

The combined party, in number over 130, were served with tea by the Misses Gardiner, after which Mr. F. W. LOCKWOOD, President of the Belfast Club, expressed the pleasure of the members of his Society in meeting their Dublin fellow-workers, and in having with them a large party of friends from Staffordshire. Mr. G. H. CARPENTER, B.Sc., President of the Dublin Club, acknowledged the compliment on behalf of his Society, and joined with his brother President in welcoming the English Field Club members. Dr. HINDE, President of the North Staffordshire Field Club, gracefully returned thanks, and spoke in terms of approval of the organization and scientific work of the Irish Clubs. After a number of new members had been elected into the various Societies, the Belfast and Staffordshire parties drove off to catch the train for the North. The Dublin members spent a highly interesting and instructive hour in examining the antiquities of Drogheda, and returned to town by the eight o'clock train.

DUBLIN, CORK, AND LIMERICK NATURALISTS' FIELD CLUBS.

A very successful meeting, and one which it is hoped marks an epoch in the history of Field Club work in Ireland, was held on July 5, 6, and 7, when the Clubs of Dublin, Cork, and Limerick met to spend three days in examining the district lying around Fermoy, and to confer on the extension of Field Club work in Ireland. Dublin was represented by a party of 19, Cork by 9, while it is a matter of regret that the able Secretary alone represented the Limerick Society. An English contingent who joined the party included Professor Carr, President Nottinghamshire Naturalists' Society. Assembling from different directions at Mallow shortly after mid-day on July 5, the joint party proceeded to Fermoy, where no time was lost in starting along the river banks for the woods of Castle Hyde. In the Blackwater *Ranunculus penicillatus* was observed in quantity, and *Anacharis Alsinastrum* with remarkably abundant blossom. The Castle Hyde woods yielded *Euonymus europæus*, *Epipactis latifolia*, *Lychnis diurna*, great profusion of *Veronica montana*, *Carex sylvatica*, and *C. remota*. The Hop (*Humulus lupulus*) was observed naturalised in hedges. By the old castle at Craig fine specimens of *Orobanchæ Hedera* were gathered. Among the beetles collected were *Orctochilus villosus*, *Hydrothassa marginella*, *Lema lichenis*, *Galerucella nymphææ*, *Rhinoncus pericarpus*, and *R. perpendicularis*. Of the hemiptera *Pithanus Maerkeli*, *Calocoris sex-guttatus*, and the local and handsome *Palomena prasina*. The dragon-fly *Calopteryx splendens* and other neuroptera were abundant along the river. The long-horned grasshopper *Leptophyes punctatissima* was found in the meadows. The party returned part by water and part by road.

On the following morning at 9 o'clock, all took their seats in waggons, and drove to the fine kistvaen known as the Hag's Bed, which was examined with interest, and photographed. The fine spider *Agelena labyrinthica* was observed in its snare in the stone wall. A little farther on, *Arabis hirsuta* and *Köhleria cristata* were gathered on walls, along with quantities of *Ceterach officinarum*, *Saxifraga tridactylites*, *Arenaria serpyllifolia*, and *Geranium lucidum*, which are very abundant in this district. *Orchis pyramidalis* was seen in the adjacent meadows. Passing through the village of Glanworth, time did not allow of inspection of the old bridge and fine ruined castle. *Hypericum dubium*, *Sambucus Ebulus*, and *Pastinaca sativa* were seen about the ruins. The next stop made was at Mitchelstown Castle, where a short time was spent, after which the party drove to Galtymore Castle, magnificently situated on the edge of a deep and richly wooded glen at the foot of the Galtee mountains. Here *Lastrea emula* grew in profusion. There was much tempting collecting ground in this vicinity, but time necessitated pushing on to Mitchelstown caves, where lunch engaged attention for a short while, after which candles

and matches were served round, and the inspection of the celebrated caverns was commenced. The passage which serves as an entrance appears to have been accidentally discovered during quarrying operations. It descends for a considerable distance at a sharp angle, afterwards opening out into a more or less horizontal series of passages with occasional expansions into caverns of considerable size, richly draped with stalactite and stalagmite. With the assistance of magnesium wire, a member took several views of these caverns. Entomologists searched eagerly for the characteristic cave spring-tail, *Lipura Stolicidii*, Schiodt., discovered here forty years ago by Dr. E. P. Wright, and the late A. H. Haliday, and their efforts were rewarded by a fair number of specimens beneath the wet rocks. A few examples of another insect of the same group, *Templetonia crystallina*, Müll., were also obtained. Male and female examples of the small spider *Porrhomma myops*, described by Simon from caves in France, were also found, as well as a gamasid mite. A few earthworms and a common Frog completed the observed fauna.

By the time the exploration of the caves was completed, the afternoon was far advanced, and the return journey was commenced; proceeding *via* Mitchelstown, Fermoy was again reached shortly after 8.o. After dinner a meeting of the combined Clubs was held. The chair was taken by Mr. G. H. CARPENTER, B.Sc., President of the senior (Dublin) Club. In opening the meeting, the Chairman expressed the pleasure of the Dublin Club at meeting so auspiciously, representatives of the Field Clubs of Cork and Limerick, and of one of the English scientific societies. Such meetings were calculated to encourage the members, and to bring about a fellow-feeling between the different Clubs. He hoped they would now hear something of the fortunes of the different Societies represented, and hints for the extension of Field Club work in Ireland; also opinions respecting the proposed conference next year of all the Irish Clubs. On behalf of the meeting, he begged to acknowledge the obligation they were under to the various Secretaries, and to Mr. Copeman, Secretary of the Cork Club in particular, for making the arrangements for the present trip.

Mr. T. FARRINGTON, F.C.S., Vice-President Cork Naturalists' Field Club, endorsed the Chairman's remarks as to their obligation to Mr. Copeman for arranging the excursion; he hoped many more such combined excursions would be held.

Mr. W. H. SHAW, Vice-President Cork Naturalists' Field Club, spoke of the excursions of his Society, and of the advantage to be gained by Field Club trips properly arranged.

Professor J. W. CARR, President Notts Naturalists' Society, thanked the meeting on behalf of his party, for the kindly welcome that had been extended to them on the present excursion, and for the friendliness with which they had been treated. In reply to the Chairman's request for information respecting the work of his Society, he thought that possibly his Society had much more to learn from these young Clubs than they could learn from the doings of his Society. He then proceeded to describe the work of the Notts Society, and concluded by saying that if an invitation were sent them to join the proposed Field Club excursion and conference next year, some of his members might be glad to accept it.

Mr. F. NEALE, Secretary Limerick Naturalists' Field Club, regretted that his club was not better represented on this important occasion. As regarded the Limerick Club, he believed that good would come of the present meeting, and he thoroughly approved of the suggestion for a meeting of all the Clubs next year. His members sometimes felt the want of a central authority to whom they might send records of interest, or submit specimens for identification.

The Chairman pointed out that it was for these very purposes that the *Irish Naturalist* had been established, and that the editors of that magazine were only too anxious to help workers in Ireland in these or any other ways.

Professor GRENVILLE COLE, F.G.S., Vice-President Dublin Naturalists' Field Club, in response to a request from the Chair, gave a short account illustrated by diagrams and maps, of the geology of the district. Subsequently he spoke of the success of the present excursion, and of the advisability of holding more of such meetings. He spoke in complimentary terms of the *Irish Naturalist*, which he considered fulfilled the very want Mr. Neale spoke of, and to which every member of the several Clubs should subscribe.

Mr. JOHN L. COPEMAN, Secretary Cork Naturalists' Field Club, thanked the members for their kind appreciation of his efforts to render the excursion a success. The Cork Club were quite in favour of the proposed excursion next year, for which Athlone and Galway had been suggested as suitable rendezvous.

Mr. R. LLOYD PRAEGER, Secretary Dublin Naturalists' Field Club, on behalf of the editors of the *I. N.*, assured the meeting of their anxiety to give information and to publish records, and to act as a means of communication between the Irish Field Clubs. As to the proposed Field Club conference, he read a letter from Mr. Bigger, Secretary of the Belfast Club, advocating such a meeting, and the meeting having now definitely approved of the scheme, he thought the matter might be safely left in the hands of his fellow-secretaries to carry out; he felt no doubt that it would have a stimulating and beneficial effect on Irish Science.

The meeting then broke up.

Early on the third morning a start was made in wagonettes down the beautiful Blackwater Valley for Lismore. On the way a few plants were noted—*Verbascum Thapsus*, *Arenaria trinervis*, and *Euphorbia hiberna* (one plant by road-side—planted?). Arrived at Lismore Castle, the "hanging gardens" were appointed a rendezvous, and members were allowed two hours to engage in their favourite pursuits. The botanists found good ground in the woods and neighbouring magnificent glen, and returned with *Milium effusum*, *Festuca sylvatica* (second record for Co. Cork), *Lastrea emula*, and *Orobancha Hederæ*.

The entomologists found Lismore an admirable collecting ground. The very rare moth *Grophria quadra* was taken by Mr. F. Neale on the bark of an oak tree, while the wings of *Dasychira pudibunda* were found in a spider's web. Beetles included *Bembidium punctulatum*, *Deronectes depressus*, *Elmis Volkmar*, *Crepidodera helixinus*, *Leipopus nebulosa*, *Athous niger*, *Galerucella lineola*, *Lagria hirta*, *Ceuthorrhynchus litura*, *Cassida equestris*, *C. viridis*, and *C. flaveola*. Among the Hemiptera were *Palomena prasina*, *Saldia saltatoria*, *Calocoris striatulus*, and *Sigara minutissima*. The dragon-fly *Calopteryx virgo* and the stone-fly *Perla maxima* were taken near the river. A complete list of the insects taken will be published in due course. Among spiders *Prosthesima Latreillei* and *Linyphia montana* were noteworthy; also *Oligolophus ephippiatus* among the Harvestmen.

At lunch, which was ready in the gardens, specimens of *Orobancha rapum*, found in the neighbourhood by the forester of the estate, were shown, and a house-spider, *Pholcus phalangoides*, new to Ireland, was discovered by Mr. D. W. Freeman in a room. The return drive to Fermoy was made along the southern bank of the Blackwater, where *Hypericum dubium* grew in great abundance on banks by the roadside. Fermoy was reached punctually at 5.0, when dinner was ready, after which the party proceeded to the railway station and departed to their several homes, amid mutual expressions of satisfaction and pleasure at the success of the excursion, and the enjoyment derived from it, and at the beautifully fine weather with which they were favoured.

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Science and Art Museum, Dublin.

R. LLOYD PRAEGER,
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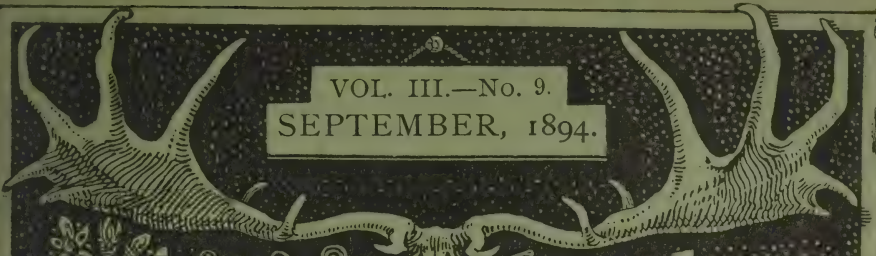
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NOTES ON THE BREEDING BIRDS OF INCH, LOUGH SWILLY.

BY D. C. CAMPBELL.

THE district of Inch, Lough Swilly, with its heather-clad hill, its extensive sloblands, and stretches of weed-grown fresh water, is a most interesting one to the ornithologist. Indeed nowhere have I found a locality frequented by so many species of birds. Professor Leebody has given much interesting information regarding the winter visitants to Inch (*Irish Nat.*, Dec., 1892). In the following paper I give a few notes upon some of the breeding birds and their nests, selecting only the more interesting species.

The first I mention is the WHINCHAT (*Pratincola rubetra*, L.). In May, 1891, Mr. Gibson and Mr. Samuel Bryson found a nest in a Whin-bush on the border of the slobland. They saw and identified the birds. This is the only instance I know of this species breeding near Derry.

The SAND-MARTINS (*Cotile riparia*, L.) used to breed in considerable numbers in the sand-bank beside Inch Road station, but of late years have almost abandoned the spot. The last time I visited the bank only one pair had nested. Close to this bank I had the pleasure of seeing together in the air at the same time the Sand-Martin, SWALLOW (*Hirundo rustica*, L.), MARTIN (*Chelidon urbica*, L.), and SWIFT (*Cypselus apus*, L.). When the Swift arrives, the winter visitants are wending their way northwards. A few, however, remain a week or two later. The Scaup (*Fuligula marila*, L.), Wigeon (*Mareca penelope*, L.), and White-fronted Goose (*Anser albifrons*, Scop.) are to be seen until the second or sometimes even until the third week of May.

The breeding ducks are the MALLARD (*Anas boscas*, L.), TEAL (*Querquedula crecca*, L.), COMMON SHELDRAKE (*Tadorna cornuta*, G. S. Gmel.), and SHOVELLER (*Spatula clypeata*, L.) The Shoveller is called here the "Spoonbill Wigeon" or "White-side." It is a constant breeder on the sloblands although, I believe, in decreasing numbers. The herd boys are, no doubt, responsible for the destruction of many eggs. The nest is made on the bare slobland, and is placed in the centre of a slight tuft of grass, or rather on a spot where the grass has grown a little more thickly than usual. There is little or no cover in the ordinary sense of the word to be seen on the ground, and I have known a nest to be made on such a bare ridge that one could not see what there was to cover the back of the brooding duck. The bird scrapes out the ground sufficiently to make a shallow saucer-like hollow. This is lined with dry grass and old grass-stems and a plentiful supply of down. In the spring of 1889 and 1890 I saw a few nests from which the old bird had evidently been driven away before laying. The usual number of eggs is nine to twelve, and there is sometimes a slight variation in size and shape. It is astonishing how the Shoveller's nests escape being trampled upon by the grazing cattle as they walk up and down the ridges.

Close by the slobland the WATERHEN (*Gallinula chloropus*, L.) and COOT (*Fulica atra*, L.) breed in great numbers in the rushes and sedges which cover the water here and there. Many years ago the WATER RAIL (*Rallus aquaticus*, L.) bred, but I have not heard of a nest having been found recently.

Some little distance from the marsh lands the shores are barer and more sandy, and here we find the RINGED PLOVER (*Ægialites hiaticula*, L.) during the spring. I have often heard the little Plovers calling around, and yet the grey plumage of their backs blended so perfectly with the wet sand and shore that it was almost impossible to spot the birds at any distance. There is much suitable ground for their breeding, but they seem to confine their nesting to a low flat sand-bank called the Farland bed. This bank is some 200 yards long by about 100 broad, and is covered in the centre with coarse grass and a few scrubby brambles. It is surrounded on all sides by fresh water. The Ringed Plover do not nest on the sand and shingle alone. A number lay

their eggs upon the grass, and my brother once found a nest in the centre of a low patch of brambles which formed a canopy over the eggs. Along with the Ringed Plovers a colony of the COMMON TERN (*Sterna fluviatilis*, Naum.) frequent the bank. The Terns arrive about the third week in May, and the eggs are usually laid by the 20th June. The nests are mostly to be found upon the grass, but in a few cases I have seen them upon the sand or gravel. So far as I can find no Arctic Terns breed in this colony. My observations confirm Thompson's statement that the Arctic Tern breeds on the coast and the Common Tern on more inland waters.

In the first week of June last Mr. John M'Connell, of Burt Slob House, Inch, who takes a great interest in the birds of the district, found the GREAT BLACK-BACKED GULL (*Larus marinus*, L.) breeding upon the Farland sand-bank. He examined the nest, which contained three eggs. The Great Gulls frequent Inch during the shooting season to prey upon the wounded birds, but never before have I heard of their remaining during the breeding season. The fact of Mr. M'Connell's finding it nesting on a sand bank surrounded by fresh water, and some seventeen miles from the open sea, is most interesting.

Passing once more to the slobland we find the LAPWING (*Vanellus vulgaris*, Bechst.) in great numbers. Its plaintive breeding cry may always be heard as one traverses the ridges on a nest-hunt. On the 4th April, 1893, while watching the Peewits from the embankment with Mr. Gibson, we noticed a male Merlin flying overhead. He had seen three Lapwing below, and like lightning he fell upon one. He missed his mark, but with a sudden and beautiful upward sweep and turn he struck the bird dead to the ground. We lay close, being only some thirty yards distant, and saw the Merlin trying to fly off with his victim. It was evidently too heavy for him, for he dropped it after flying a few yards. We then showed ourselves, and off the Merlin flew to some distance, where he kept beating about for some time, evidently loth to lose his prey. When we lifted the Lapwing it was quite dead.

Along with the Lapwing many REDSHANK (*Totanus calidris* L.) nest. The Redshanks leave their winter haunts along the shores during the first and second weeks of April, and about a fortnight later the nests are to be found. These are a little

more artistic than those of the Peewits, but still can hardly be called "things of beauty." They are slightly built of dry grass, and are placed in the centre or by the side of a fairly large tuft of grass. The nest is very hard to find, although the old birds always betray its presence by dashing overhead and uttering their loud alarm notes "tu hu—tu hu." From this cry the bird receives here the name of "Tu-hu" or rather "Big Tu-hu," the Dunlin and Ring Plover being called the "Wee Tu-hu."

I have a most interesting note which shows the care the Redshank takes of its young. On 21st May, 1891, I was working the slobland with Mr. Gibson and Mr. Bryson. We were most anxious to find a Redshank's nest, but feared we were too late for eggs. A pair of birds were however dashing about overhead, and every now and then one of them dropped to the ground some way off. We felt sure that the young birds were near, and for some time we marched up and down the ridges, not missing a single yard of ground. Still no nest or nestlings were to be seen. At last, while we were talking the matter over we suddenly caught sight of one of the Redshanks away at the other end of the slob-ridge, running across the very line of march we had taken. With the bird was a little nestling, and bringing our glasses to bear we saw that the old bird was leading the little one back to the ground which we had just so carefully searched, so that it would be quite clear of the unsearched ground when we arrived at the spot.

Among the breeding birds at Inch, the DUNLIN (*Tringa alpina* L.), is to me about the most interesting. In summer dress with richly marked back, and black-banded breast, it is very beautiful, and looks so different from the plain little grey bird that frequents the shores in winter. On reaching the slobland, before we see the birds we hear their *purring whistle*. It is very hard to locate the exact spot from which the sound comes. Now it seems to sound from the water's edge, now from the distant fields. Thompson refers to the Dunlin's song heard in spring and summer, but I cannot say that we ever heard any notes which could be called a song. We met the birds singly and in pairs, and now and then in small flocks. When met with singly or in pairs they were comparatively tame. The nest is very difficult to find, and it requires con-

siderable time to hunt up five or six. The site chosen is always one of those small tufts of rough grass that are scattered over the slob. The nest is nearly always placed in the centre of the grass, but occasionally I have seen it at the side. It is deeper and more cup-shaped than the Redshank's. The neat little nest, with its four richly marked eggs, is a beautiful sight. In one nest the eggs will all have a warm brown colour with very dark markings; in another the quartet will be pale olive with deep gray spots. Morris says that the Dunlin will fly towards an intruder and endeavour to draw him away from its nest. The very opposite of this was our experience. In no case did we find the birds near their nests, nor did they show themselves, like the Lapwing and Redshank. Thompson mentions the eggs being found upon the gravel like those of the Ringed Plover. At Inch we never found them so. In every case the nests were upon the slobland.

A VISIT TO CASTLETOWN-BEREHAVEN.

BY DAVID M'ARDLE.

It was my good fortune during the May of last year to accompany the first excursion to the extreme South-west, which was organised by the Royal Irish Academy Flora and Fauna Committee, my object being the working-up of the Cryptogamic flora of these parts, and the obtaining of specimens for the Herbarium. Dr. Scharff and Mr. Carpenter of the Natural History Museum, collected and investigated the land-fauna. Professor Johnson, with Mr. Duerden, investigated and collected marine plants and animals, and to Dr. M'Weeney fell the difficult task of investigating the Fungi; he also conjointly with myself noted and gathered the flowering plants and ferns. The principal object of my visit was to examine the moss and liverwort flora, which proved to be very interesting, as will be obvious from the appended lists.

The following is a brief outline of our proceedings. We left Dublin by the mail at 6.10 p.m., on the 26th May, and arrived in Cork at 11.30. Next morning we started at 9 o'clock for Bantry. The scenery on the route was beautiful. On the banks of the Bandon River the Royal Fern (*Osmunda regalis*)

grows abundantly ; the water was dotted with pale sheets of a *Ranunculus*, which floated many yards in extent, covered with flowers. In the small lakes in the adjacent bogs the White Water-lily (*Nymphaea alba*) was in full bloom, and ferns of the *Lastrea* type clothed the ditch banks, mixed with large specimens of the Irish Spurge (*Euphorbia hiberna*). A shallow peat-bog was most interesting ; the turf was being removed for fuel, and exposed the remains of an ancient forest. Many of the trunks were prostrate as they fell, others, much shorter, were standing in their natural position. From Bantry there are two routes to Castletown-berehaven, where we were to stay, one by water, and the other by land. One of the party went in a small steam-boat, taking luggage, &c., while the remainder continued the journey by car, not a "Bianconi," on which most of us at some period or other have made long journeys, but a comfortable omnibus, from the outside of which one can enjoy the scenery, and we soon made considerable progress through a most interesting country, the road being flanked on either side by wild rocky glens clothed with verdure. The harbour of Glengariff soon appeared in view, then the village, where we remained for a short time to change horses, and on again for Castletown-berehaven. We got an excellent view of the Sugar-loaf and Caha Mountains. The "Deadhe," or Hungry-hill is conspicuous above all the others from its towering height ; on its summit is a small lake that bears the reputation of harbouring something "uncanny" beneath its dark waves, and two of our party, when collecting there, were warned in a solemn strain by a kindly native not to go near it. We passed the famous waterfall at Adrigole, and although only a slight stream was then falling we could form an idea of its grandeur after a heavy rainfall. We soon arrived at our destination, and were comfortably settled in Mrs. Murphy's Hotel.

The following day (Sunday) was quiet, and with the exception of an afternoon stroll about Dunboy, we did no actual work. On the 29th we carefully examined the bogs and lakes about Castletown-bere, and on to Pulleen. On the river bank *Rosa mollissima* was in bloom, and partly submerged *Littorella lacustris* was in fine form. On the rocks at the mouth of the river at Pulleen Cove we gathered Templeton's pretty *Enthostodon*, and a rare liverwort, *Fossombronia angulosa*,

Dicks., which was growing abundantly in the crevices of the rocks forming the bed of the stream. On the 30th, Dr. M'Weeney and I crossed to Bere Island, noted the more common plants, and took specimens of any rare or interesting ones, amongst which was *Cicendia filiformis*, of which Dr. M'Weeney detected a few plants near the end of the island, not far from Piper's Point. This was the most interesting find amongst the flowering plants. We also gathered *Nasturtium amphibium*, Br., *Rosa pimpinellifolia*, L., *Myosotis collina*, Hoffm., and a few plants of *Pinguicula lusitanica*, L. Amongst the mosses I gathered *Campylopus longipilus*, Bridel., and *C. setifolius*, Wils., and the following rare liverworts:—*Frullania germana*, Taylor, *Cephalozia denudata*, Spruce (Lindberg), previously known to grow in only two localities in Ireland; *C. divaricata* var. *Starkii*, Spruce (= *J. Starkii*, Funck), *Kantia arguta*, Nees., *Nardia hyalina*, Lyell., *Fossombronina pusilla*, L., *F. angulosa*, Dicks. The early part of the day only was favourable for our work, as in the afternoon it rained heavily, which, however, did not prevent us from covering a large portion of the island, and gathering many plants. A week might be spent collecting on the island with good results. On the 31st, Dunboy Wood and adjacent bogs were carefully examined. *Saxifraga umbrosa* and *Euphorbia hiberna* were in fine form; amongst the liverworts, *Lejeunea flava*, Swartz, the typical plant, not differing in form or luxuriance from specimens gathered by Dr. Spruce in the Amazon Valley in South America, and seven other species of the genus were gathered in more or less abundance in this moist, warm, shaded wood, including *Harpa-Lejeunea ovata*, Taylor (Spruce). I also detected *Kantia arguta*, Nees., *Nardia hyalina*, Lyell., and *Metzgeria conjugata*, Dill., and doubtless other varieties would reward a careful search. On the bogs, *Drosera rotundifolia* and *D. intermedia* were abundant and vigorous in the bright sunshine. A plant of the latter species had enfolded a Dragon-fly with its glandular tentacles.

On June 1st, at 6 a.m., we all boarded the steamship "Tearaght" in Bantry Bay, commanded by Captain M'Combie, who was much interested in our work, and promised to land us on Dursey Island, which he was passing. We had a good view of the rocky coast, Pulleen Harbour, Ballydonegan Bay, &c.; a sumptuous breakfast with our kind host concluded

this little sea trip, which is not likely to be forgotten by us. The island we found scanty in vegetation on account of its exposed position and the dry season. *Senebiera Coronopus* was plentiful near the sea where we landed. *Anthyllis vulneraria* was abundant in bloom everywhere, and isolated patches of *Rosa spinosissima* were met with in several places. *Asplenium marinum* and *Crithmum maritimum* were plentiful amongst the rocks near the sea. Amongst the mosses *Campylopus longipilus*, Bridel., was plentiful in damp places, and on the rocks *Grimmia trichophylla*, Greville, and *G. leucophæa*, Greville, were gathered. The rarest amongst the liverworts collected were *Frullania germana*, Taylor, *Cephalozia divaricata* var. *Starkii*, Spruce, *Nardia obovata*, Nees (Carrington), very scarce; this is the true plant, with ascending stems and purple rootlets. *N. hyalina*, Lyell, *Fossombronia angulosa*, Dicks., plentiful amongst rocks near the sea. We collected carefully up to the highest point of the island at Ballymacallach (?), from which the view of the Kerry mountains compensated in some degree for the scantiness of the vegetation. We crossed from the island to the mainland at Garnish-point, and collected on the coast and hills for some distance, where we were joined by the rest of the party, and drove into Castletown. On June 2nd, we started early for Adrigole, and struck the river about $3\frac{1}{2}$ miles from the waterfall, following its rather tortuous course, and some good collecting was done. *Cicendia filiformis* we gathered sparingly by the side of a pathway; *Lobelia Dortmanna* in bloom by the river bank; *Pinguicula grandiflora* was in great beauty, and many pretty varieties of *Orchis maculata*; *O. incarnata* *Habenaria bifolia*, and *H. chlorantha*, and other plants were gathered in this moist valley. We ascended Caha Mountain, following the margin of a small stream, and some interesting cryptogams and other plants were collected. We found *Hymenophyllum tunbridgense*, Sm., and *H. unilaterale*, Willd., to be very scarce, though both species abound on the other side of the range at Glengariff. Amongst others we collected the following mosses and liverworts:—*Campylopus flexuosus*, Dill., *Distichium capillaceum*, Br. & Sch., *Scapania æquiloba*, Dumort., *S. umbrosa*, Schrad., *Plagiochila punctata*, Tayl., and *Riccardia latifrons*, Lindberg. We arrived at the summit about 6 p.m., and carefully examined the lakes, which

are numerous. *Potamogeton polygonifolius* was plentiful; *Apium inundatum*, Reich., we gathered in the largest lough (Lough Brandy?) We descended the rather steep slopes to the valley of Glengariff, the woods of which afford good collecting, but it was now too late to do much, so we hurried on to the Belle Vue Hotel, tired after a hard day's work. Next morning we started for Bantry, and on to Cork, where we got the mid-day train, and arrived in Dublin about 5.30 p.m., and thus ended one of those enjoyable excursions not to be forgotten, and far from being devoid of interest. The time for collecting over such a wide area was very short, and the pace in consequence was very fast. The total number of Phanerogams and Ferns collected or noted was 165. Of the mosses 38 species and varieties were collected, amongst them the following nine species are not reported from Co. Cork in Dr. D. Moore's work on the mosses of Ireland:—*Campylopus longipilus*, Bridel., *C. setifolius*, Wils., *C. flexuosus*, Dill., *Distichium capillaceum*, Br. & Sch., *Grimmia trichophylla*, Greville, *G. leucophœa*, Greville, *Gymnostomum rupestre*, Schwaegr. (= *Mollia ceruginosa*, Smith), *Bryum pseudotriquetrum*, Schwaegr., *B. erythrocarpum*, Schwaegr. var. *B. murorum*, Schimp. (= *B. muralis*, Wils.). Fifty species and varieties of Hepatics were collected, many of these in Dunboy wood; this place and Glengariff would well repay a visit of longer duration. The following twenty-seven have not been reported from the Co. Cork previously, that I am aware of:—*Frullania germana*, Taylor, *Lejeunea patens*, Lindberg, *L. flava*, Swartz, *L. flava*, Spruce (the yellow-green form), *L. Moorei*, Lindberg, *L. ovata*, Taylor, *Cephalozia catenulata*, Huben, *C. bicuspidata* var. *setulosa*, Spruce, *C. Lamersiana*, Huben, *C. curvifolia*, Dicks., *C. (Odontochisma) denudata*, Lindberg, *C. divaricata* var. *Starkii*, Spruce, *Kantia arguta*, Nees, *Lepidozia setacea*, Web. (Lindberg), *Scapania undulata* var. *purpurascens*, Huben, *S. nemorosa*, Dumort, *S. umbrosa*, Schrad., *Plagiochila punctata*, Tayl., *Nardia crenulata*, Sm. Lindberg, *N. gracillima*, Sm. Lindberg, *N. obovata*, Nees, *N. hyalina*, Lyell, *Fossombronina pusilla*, Linn., *F. angulosa*, Dicks. *Pellia calycina*, Nees, *Metzgeria conjugata*, Dill., *Riccardia latifrons*, Lindberg, *R. pinguis*, Linn. To Mr. A. G. More, F.L.S., and Mr. R. Lloyd Praeger I offer my best thanks for their kindness when consulted on matters of doubtful nomenclature.

NOTES ON GLACIAL DEPOSITS IN IRELAND.

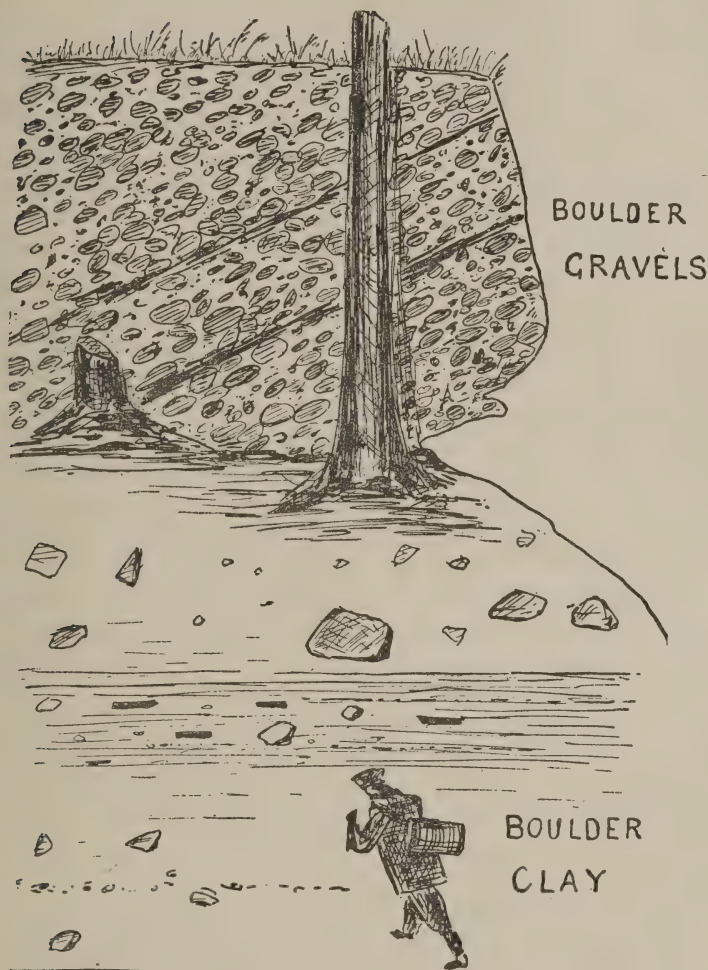
BY PROFESSOR W. J. SOLLAS, F.R.S., AND R. LLOYD PRAEGER, B.E.

I.—THE BRAY RIVER.

(Concluded from page 166.)

Crossing the bridge at Enniskerry, and turning back towards Bray down the northern side of the stream, we find a steep wooded slope rising above the stream-bed to a height of perhaps 100 feet. This is formed of glacial deposits from foot to summit, the lower half, roughly speaking, being boulder clay, the upper half boulder gravels. Sections are few, and the beds where seen are very similar in character to those on the other side of the river, which have just been described; we therefore pass them by, and proceed to the interesting exposures, not yet dealt with, which occur on the southern bank between Bray and Dargle bridge. Leaving Bray, we cross the end of a little valley where a streamlet has cut through the drift to a depth of fifty or sixty feet, and find our first section in a wooded bank which overhangs the stream; the base of the section is but a foot or two above the level of the river, which here flows through a flat alluvium-filled valley to the sea, with steep bluffs of drift rising boldly on either bank. In our first section (fig. 4) we find twelve feet of red boulder clay succeeded by a conglomerate of boulder gravels. In places the boulder clay is clearly laminated; at one spot fourteen alternating horizontal layers were counted in a height of six inches, the different laminae being distinguished by the predominance of sand or clay; while a band of small pebbles, some three inches in thickness, was traced horizontally along the cliff for a distance of thirty to forty feet. The stones in the boulder clay are for the most part small (one inch in diameter), but a few are one to two feet across; they consist chiefly of Carboniferous limestone, Cambrian quartzite, and granite. The flatter stones lie parallel to the lamination planes; the larger and more irregular fragments lie in no particular direction. A careful examination of this laminated clay revealed no indication of shearing having taken place, and the stratification appeared such as could only be produced by deposition in water. Fragments of marine shells are frequent. The clay becomes a little more stony towards the top, and is

FIG. 4.



succeeded sharply by boulder gravels, in the form of loose coarse angular sand, without clay, and containing pebbles of all sizes. The surface of the boulder clay being cleared of this deposit, it was observed that the stones in the clay projected quite irregularly, without forming a pavement or showing any general striation. The stones in the boulder gravels were as usual—Carboniferous limestone, red Cambrian slate, granite,

riebeckite granophyre, and vein quartz, many thoroughly rounded. One inch above its junction with the boulder clay the deposit is cemented into a hard conglomerate for a thickness of several feet. This section corresponds to that which lies near the road on the other side of the river. As we pass up the river-bank along this section, the boulder gravels present us with an exceedingly complex succession of deposits. Not far from the section just described, we observe above the boulder clay a bed of fine sand some five feet thick, well laminated, and containing numerous fragments of *Tellina balthica*, *Astarte sulcata*, *A. borealis*, *Leda pernula*, and other species of marine shells. This is succeeded by fourteen feet of boulder gravels, of the usual character in the lower half, but in the upper half formed of an irregular layer composed almost exclusively of fragments of slate. Above this is ten feet of exceedingly fine laminated sand. The boulder gravels contain blocks of granite, some three feet long by one foot six inches thick. One of these is of particular interest since it contains spodumene, and closely resembles the granite which occurs at Ballycorus Hill, two miles to the N.W.; granite containing spodumene was also at one time found in the quarry at Killiney, four miles N. The boulder gravels continue with varying character some distance up the stream. The bed characterised by slate fragments thins out in lenticular fashion within a short distance. Near its termination the slate fragments were observed lying parallel with the oblique lamination which there characterises the deposit. A remarkable feature of this bed here is the presence of numerous included rolled fragments of red boulder clay. The occurrence of great fragments and pebbles of boulder clay is a noticeable feature of the boulder gravels near their junction with the boulder clay. The occurrence near the base of the boulder gravels of a distinct layer of pebbles to which pebbles of boulder clay contribute is also to be observed. We need not refer again to the varying character of the boulder gravels at this place except to observe that the fine sand replaces the gravels and pebbly beds until thirty feet of finest sand appears, extending down to within twelve feet of the river. A little further up the valley pebbly boulder gravels again come in, and eventually entirely replace the sand.

As regards the boulder clay, its lamination may be frequently

observed, particularly in its upper portion; it is well seen in the cliff at the sluice where a mill-race leaves the river two-thirds of a mile above Bray Bridge. Here the lower part is horizontally banded somewhat coarsely, and contains large boulders; in the upper portion it becomes much more finely, but still horizontally laminated, and the included stones are smaller; in this portion blackish layers are separated by white ones of granite sand, two inches in thickness. Shell fragments are abundant here; the species identified were *Cardium edule*, *Cyprina Islandica*, *Astarte sulcata*, *A. borealis*, *Tellina balthica*, *Mya truncata*. The boulder clay is here overlaid by a bed of boulders, remarkable for their size, being frequently three feet long by two feet high. One of them was of Lambay porphyry, rounded, polished, and grooved. If we ascend the cliff and the succeeding slope to the S.E., we reach a road leading to Bray, which runs above the valley parallel to the stream, and in a cutting here is seen a blue sandy clay, containing striated boulders chiefly of Carboniferous limestone, together with granite, and also fragments of marine shells. This is evidently a boulder clay overlying the boulder gravels, and separated by them from the thick deposit of boulder clay which we have described; numerous other sections terminate upward in a somewhat similar manner.

It is an admitted generalisation, to which we have found no exception, that the surface of the rocks underlying the boulder clay have been denuded by glaciation; and the district which we have described, like other districts in Ireland, has evidently been overridden by ice. This denuded surface is overlaid by a thick deposit of boulder clay, which points clearly to a period of deposition. The conditions under which the boulder clay was deposited cannot have been, as appears so generally assumed, the same as those under which the district was denuded. Fine clay is generally deposited in quiet waters some distance from its source, and our boulder clay has much the aspect of a tranquil marine deposit. On the other hand, the boulder clay contains large stones, but these are of an exceptional character, they show signs of glaciation, and are suggestive of a different mode of transport. Judging from the thickness of the boulder clay, the conditions under which it was deposited must have persisted for a considerable period. The intercalation of occasional beds of

gravel and sand marks episodes in this period prophetic of the great change of conditions which brought in the boulder gravels. These, by their coarseness, and by their sudden and frequent changes of character, can only have been deposited by swiftly moving water, which was even capable of denuding the boulder clay in one place before depositing it as rounded pebbles in another.

INSECTS COLLECTED BY THE ROYAL IRISH
ACADEMY FLORA AND FAUNA COMMITTEE,
1893.

BY REV. W. F. JOHNSON, M.A., F.E.S., J. N. HALBERT, and
GEORGE H. CARPENTER, B.SC.

LEPIDOPTERA.

No very striking results rewarded our work among the butterflies and moths, the majority of the species obtained being common and widely distributed. Under these circumstances we content ourselves with a simple enumeration of the insects from each locality, commenting only on the scarcer and more interesting specimens at the end.

At COOLMORE the following species were taken:—*Pararge egeria*, *P. megera*, *Satyrus semele*, *Epinephele ianira*, *E. hyperanthes*, *Argynnis paphia*, *Vanessa urtica*, *V. atalanta*, *Polyommatus phlaeas*, *Lycena icarus*, *Pieris rapae*, *P. napi*, *Zygena filipendulae*, *Nudaria mundana*, *Arctia caia*, *Notodonta ziczac*, *Leucania conigera*, *L. comma*, *Xylophasia lithoxylea*, *X. monoglypha*, *Chareaeae graminis*, *Luperina testacea*, *Mamestra furva*, *Apamea leucostigma*, *A. didyma*, *Miana fasciuncula*, *M. literosa*, *M. bicoloria*, *Caradrina taraxaci*, *C. quadripunctata*, *Agrotis vestigialis*, *A. tritici*, *Noctua augur*, *N. baia*, *N. xanthographa*, *Triphena ianthina*, *T. comes*, *T. pronuba*, *Amphipyra tragopogonis*, *Polia chi*, *Phlogophora meliculusa*, *Hadena oleracea*, *Gonoptera libatrix*, *Plusia gamma*, *Habrostola tripartita*, *H. triplasia*, *Hypena proboscidialis*, *Selenia bilunaria*, *Acidalia bisetata*, *Abraxas grossulariata*, *Larentia didymata*, *Hypsipetes sordidata*, *Melanippe sociata*, *M. fluctuata*, *Campptogramma bilineata*, *Cidaria testata*, *Pelurga comitata*, *Eubolia limitata*, *Anaitis plagiata*, *Scopula lutealis*, *Hydrocampa stagnata*, *Platyptilia ochrodactyla*, *Crambus tristellus*, *C. perilellus*, *C. culmellus*, *Tortrix ribeana*, *Argyrotoza convayana*, *Catoptria cana*, *Simethis fabriciana*, *Eupocilia atricapetana*, *Plutella annulatella*, *Lila marmorea*.

At CAVAN the only moths taken were *Hydræcia micacea*, *Teniocampa munda* (pupæ), *Scopelosoma satellitia*, *Xanthia circellaris*, *Xylina ornithopus*, and *Oporabia dilutata*.

Around BEREHAVEN, the species captured or noted were:—*Pararge egeria*, *P. megera*, *Cenonympha typhon*, *C. pamphilus*, *Melitæa aurinia*, *Vanessa atalanta*, *Polyommatus phlaeas*, *Lycena icarus* (these two lycaenids were the only butterflies observed on Dursey), *Thecla rubi*, *Pieris brassicæ*, *P. napi*, *Euchloe cardamines*, *Gnophria rubricollis*, *Eucholia jacobæe*, *Nemeophila russula*, *Spilosoma menthastri*, *Boarmia repandata*, *Scodiona belgaria*, *Ematurga atomaria*, *Aspilates strigillaria*, *Lomaspilis marginata*, *Campptogramma bilineata*, *Botys fuscalis*, *Scopula ferrugalis*, *Crambus pratellus*, *Bactra lanceolana*. At GLENGARIFF, *Angerona prunaria* was taken.

Melitæa aurinia, Rott.—This butterfly was abundant at Berehaven. In low-lying meadows the typeform occurred, but on the slopes of Slieve Mishkish and at Adrigole the cream-coloured var. *hibernica*, Birchall (*scotica*, Kane) was found.

Cœnonympha typhon, Rott.—Common around Berehaven and Adrigole, both on low-lying moors and on the mountains, often in company with *C. pamphilus*. The presence of this butterfly, which in Great Britain does not range south of North Wales and Derbyshire, in the extreme south of Ireland is a striking instance of the northern element in the fauna of the district.

Gnophria rubricollis, L.—Berehaven; a specimen of this local moth was taken in the wood of Dunboy.

Nemeophila russula, L.—Berehaven; common on the elevated moors of Slieve Mishkish and Adrigole.

Mamestra furva, Hb.—Coolmore; a northern locality for this species is of interest as Birchall recorded it only for Co. Dublin. Dr. Scharff took it at Bundoran in August, 1889, Mr. Johnson in July, 1890, as well as at Carlingford in August, 1888.

Apamea leucostigma, Hb.—Coolmore; apparently a local species in Ireland, though widespread.

Tæniocampa munda, Esp.—Cavan. Killarney is the only locality given by Birchall.

Xylina ornithopus, Rott.—Cavan. This species also is only recorded for southern localities—Killarney and Wicklow—by Birchall.

Camptogramma bilineata, L.—The ordinary form of this common moth was taken at Coolmore and Castletown, but on Dursey a remarkable melanistic variety was found, in which the yellow of both fore and hind wings is largely replaced by a rich chestnut, a narrow transverse ochreous band between the second and subterminal white lines alone being left.

Pelurga comitata, L. } Coolmore. Birchall recorded these moths
Scopula lutealis, Hb. } from Howth. Also occur at Armagh.

Platyptilia ochrodactyla, Hb.—Coolmore. Recorded from Cos. Dublin and Cork. Occurs at Armagh.

Argyrotoza conwayana, Fb.—Coolmore. Taken by Birchall in Cos. Wicklow and Galway. Occurs at Armagh.

Gatoptria cana, Haw.—Coolmore. Only recorded from Howth by Birchall. Occurs at Armagh.

Eupœcilia atricapitana, Steph.—Coolmore. Apparently not previously recorded for the coast of Ulster.

HYMENOPTERA.

The only family of this order to which any attention was given were the Ants, of which the following four species were taken.

Formica fusca, Latr.—Killarney. Berehaven.

Lasius flavus, D. G.—Coolmore. Killarney. Berehaven.

L. niger, L.—Berehaven.

Myrmica rubra, L., race **ruginodis**, Nyl.—Coolmore. Killarney Berehaven.

race **scabrinodis**, Nyl.—Coolmore. Berehaven.

race **lævinodis**, Nyl.—Coolmore.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a mongoose from Mrs. Taylor; a seal from R. Chambers, Esq.; a Cow-bird, a Red-headed Cardinal, a pair of Pekin Bantams, and two Wax-bills from J. B. O'Callaghan, Esq.; three Corn-crakes from J. A. Curran, Esq.; a pair of Long-eared Owls from L. Owens, Esq.; a pair of Canadian Ducks from H. M. Barton, Esq.; four Rabbits from Master R. L. Weldon; three Turtle-doves from C. J. Wallace, Esq.; and a Water-rail from Mr. Keegan. A Golden Agouti, two Java Peacocks, and two Wallabys have been acquired by purchase.

15,750 persons visited the Gardens in July.

DUBLIN MICROSCOPICAL CLUB.

JUNE 21ST.—The Club met at Mr. F. W. MOORE'S.

PROF. T. JOHNSON exhibited *Litosiphon laminariae*, Harv., a brown seaweed to be found growing in small tufts, epiphytically on *Alaria esculenta*, Grev., near low-water mark all round the Irish coast. The interest of the specimen was that it showed plurilocular sporangia, hitherto unobserved, and filaments bearing unilocular sporangia also, an unusual feature in any brown alga. Comparison of the species with *Pogotrichum hibernicum*, Johnson, was made.

DR. M'WEENEY showed a slide of a curious species of *Fusarium* that occurred in a zoogloea on the surface of a specially-devised nutrient liquid which had been sterilised and then inoculated with a small trace of solid sewage sludge. In addition to the usual sickle-shaped, triseptate spores, smaller oval ones occurred intercalated on the mycelium, as well as terminally, on exceedingly thin, lateral, alternating branches. Mixed with the hyphæ, but not organically connected therewith, were very numerous circular resting-spore-like bodies with two thick, highly-refractive coats, and a relatively small amount of granular protoplasm in the centre. Many of these bodies attained a diameter of 20μ , and were surrounded by a sort of halo of finely granular mucoid-looking material. Thousands of such bodies occurred in the zoogloea, giving it a peculiar opaque and patchy appearance to the naked eye. The mass of the zoogloea was made up of the *Fusarium*, the bodies just described, and bacteria. The only other organism present was a sort of uniflagellate monadine, which jerked about with great rapidity, and was to be seen in various stages of division, first into two, then into four segments, each of which assumed a flagellum, and after rotating together with the others within a highly transparent cyst wall, ultimately became free. Fortified by the opinion of Prof. Marcus Hartog, to whom he had submitted fresh preparations, the exhibitor was inclined to regard the thick-walled "resting-spore" as part of the monadine's cycle of development rather than as belonging to the *Fusarium*, with which it was certainly closely intermixed, but, even with the best lenses, not organically connected. The double wall of the object gave no cellulose reaction. The central protoplasm had been seen to escape as an amœoid body through the inner wall, but had not been seen to emerge through the outer covering.

MR. M'ARDLE exhibited *Jungermania attenuata*, Lindenberg, an addition to the list of Irish Hepaticæ, which he collected in some quantity on the hill of Howth in April and May of the present year, growing on peaty soil amongst limestone rocks in company with *Tetraphis pellucida*, Hedwig, a pretty minute moss, with filiform erect stems, which has not been previously reported from the County Dublin. Mr. W. H. Pearson, of Manchester, who verified Mr. M'Arde's specimens of the liverwort, states that he believes *Jungermania gracilis*, Schleich., has priority over *attenuata*, Lindenberg, which is a pity, as the latter name is far the better.

Plants growing in dense dark green patches, stems from one-quarter to nearly one inch in length, lower half nearly procumbent, radiculose, leaves large, patent, roundish, concave, divided into two to four teeth, innovations from upper half sub-cylindrical, leaves closely imbricate, ovate, nearly quadrate, irregularly toothed or crenulated at apex, stipules (underleaves) small ovate entire, often absent.

Jungermania barbata, B. *minor*, Hook., Brit. Jung., t. 70, fig. 18-22; *J. attenuata*, Lindenberg, Hepat. Europ., p. 48, No. 44; Dumort Hepat. Europ. p. 71; Cooke's Handbook of British Hepaticæ, p. 179; *J. attenuata*, Carrington and Pearson Hepat. Brit. Exiccatae No. 74, from Abbey Wood, Kent (E. M. Holmes) *vera*. In Herb. Trinity College, Dublin, under *Jungermania intermedia*, Yorkshire (West legit.) Also found in Germany and Switzerland.

PROF. GRENVILLE A. J. COLE showed a section of Chert from the Aptian sandstone (Hythe Beds) of Leith Hill, Surrey. The chalcedonic silica has collected round the quartz-grains of the sand, firmly cementing them, and includes also numerous grains of glauconite. The chief interest, however, centres in the abundant glauconitic casts of the tubules of hexactinellid and tetractinellid sponge-spicules, which have been left behind as evidence of the spicular origin of the silica which now exists in the form of chert. In some cases the original spicule remains round about the internal cast. The casts are often larger in cross-section than the normal tubules of sponge-spicules, owing to the enlargement of the tubules by solution prior to the infiltration of the glauconite.

Mr. DUERDEN exhibited *Plumularia similis*, Hincks, a rather rare hydroid obtained from shore-collections made between Laytown and the mouth of the River Boyne, on the occasion of the recent visit of the Dublin Naturalists' Field Club. It has only previously been recorded in Ireland from Dublin Bay and Donaghadee.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

JUNE 11th.—Annual Meeting. The President (PROF. FITZGERALD, C.E.) in the chair. The Secretary (R. M. YOUNG, M.R.I.A.) read the annual report, which was passed on the motion of Mr. J. H. DAVIES, seconded by Dr. M'CORMAC. The Secretary read a list of the lectures which will be given in Belfast next winter in connection with the Gilchrist Trust. Prof. Fitzgerald having expressed his wish to retire from the office of President, a vote of thanks to him for his services was passed, on the motion of Mr. R. Lloyd Patterson, seconded by Mr. Workman. At a meeting of the Council held subsequently, Mr. R. LLOYD PATTERSON was elected President for the ensuing year; the other officers resumed office.

NOTES.

BOTANY.

PHANEROGAMS.

A New Irish Bramble.—In the *Journal of Botany* for July Rev. E. F. Linton publishes, under the name of *Rubus Rogersii*, a description of a bramble allied to *R. plicatus*, *opacus*, *nitidus*, and *affinis*, which he considers distinct, and names in honour of Rev. W. Moyle Rogers, who has done so much to aid the study of British brambles. One of its five known stations is in Ireland—Saintfield, Co. Down, where it was collected last year by Rev. C. H. Waddell.

Carex axillaris and Filago minima in Co. Dublin.—Towards the end of July last, while availing myself of permission kindly granted me by the Great Northern Railway Company to examine the embankments of their line within the Co. Dublin, I had the good fortune to come across a few large tufts of *Carex axillaris* (Good.) in marshy ground near Malahide. This rare sedge has been regarded as a hybrid between *C. remota* and *C. muricata*; but in this station, though the first of the reputed parents was present in abundance, accompanied by *C. vulpina* and *C. divulsa*, *C. muricata*, a species I have long sought for without success in the Co. Dublin, was quite absent. Mr. A. G. More, to whom I have submitted specimens, prefers to regard the plant as a product of *C. remota* and *C. vulpina*. There is no previous record of *C. axillaris* in Co. Dublin, and elsewhere in Ireland it appears to have been observed in only one station in addition to those given in *Cybele Hibernica* and Mr. More's *Recent Additions to the Flora of Ireland*, on the Upper Barrow, in Queen's Co., where it was found by Mr. Hart in 1884. (See *Jour. of Bot.*, Jan., 1885).

For *Filago minima*, a rather uncommon species in Ireland, there seems to be no Co. Dublin station on record, so that it may be of interest to note here its occurrence in considerable quantity at Balalley, near the Three Rock mountain, where I found it growing amongst the debris of a granite quarry in July last.—NATHANIEL COLGAN, Dublin.

ZOOLOGY.

PYCNOGONIDA.

Further Irish Localities for Pycnogons.—On page 67 of the present volume I recorded an additional locality for *Anoplodactylus petiolatus*. I have since received from Mr. J. E. Duerden numerous specimens of both sexes of this species dredged by the Harlequin in yet two other stations—one (222), Boyleash Bay, Co. Donegal, 20 fms. sand; the other (148) to the south of Aran Islands, 39 fms. sand. This species is therefore known to range along nearly the whole of the west coast.

Mr. Duerden has also kindly handed me some pycnogons collected by him in the rock pools of Dursay in May, 1893. The species represented are *Pycnogonum litorale*, *Phoxichilidium femoratum*, *Nymphon gracile*, and *N. rubrum*; the last had hitherto been known only from the east coast.

From Mr. H. H. Dixon I have received *Nymphon gallicum* taken in Smerwick Harbour.

A specimen of *Chatonymphon hirtum*, Fab., taken off Dalkey Island by the late Dr. Kinahan, has recently come to light in the museum. Rev. Canon Norman has recently (*Ann. M. N. H.*, Feb., 1894.) given good reasons for reckoning *C. spinosum*, Goods. (which Thompson recorded from Belfast Bay) as a synonym of this species.—GEO. H. CARPENTER.

INSECTS.

Vespa arborea, Sm. in Co. Dublin.—In the *Irish Naturalist* for July (p. 157), I mentioned that this rare wasp was not among those taken this spring at Bray by Mr. Barrington. During June and July however it occurred at two localities in Co. Dublin, Mr. H. B. Rathborne taking a queen at Dunsink, and Mr. G. Low two at Dundrum. These latter are remarkable in having the yellow line on the scape of the antennae almost obsolete, but in all other respects they are typical. Mr. E. Saunders, in his work on British Hymenoptera now appearing, states that this wasp is a variety of *V. austriaca*, Panz., by which name it will therefore henceforth be known. It is to be hoped the male, and as yet unknown worker, may soon be found.—GEO. H. CARPENTER.

Coleoptera in Co. Dublin.—The following is a list of some beetles recently taken by me about Dublin, given with the intention of recording a few species new to the district, or Ireland, and of supplying additional localities for some already recorded. *Elaphrus cupreus*, Dodder bank, Friarstown Glen, locally common; *Leistus rufescens*, Santry; *Dromius quadrimaculatus*, Enniskerry, and under hawthorn bark, Phoenix Park, much rarer than *quadrimaculatus*; *Chlenius nigricornis*, Dodder bank, Friarstown Glen; *Olisthopus rotundatus*, common under stones on Howth; *Cilleus lateralis*, shore near Sutton, under sea-weed, previously recorded by Mr. Haliday both from this district and the south-west coast of Ireland; *Bembidium rufescens*, Tolka Valley, under hawthorn bark; *B. atrocyberum*, Royal Canal bank (new to Dublin list); *Celambus quinquelineatus*, Royal Canal, Santry, Raheny, etc., frequent; *Deronectes assimilis*, in the spring of last year this beetle was very common in the Royal Canal near Dublin, it seemed not to be so common this season; *Deronectes xii.-pustulatus*, Dodder, near Dublin (Dr. Scharff took it last May in the quarries near Raheny); *Enochrus bicolor*, I found a specimen last summer in the old quarries at Raheny and again last May (it does not seem to have been previously recorded from Ireland); *Laccobius sinuatus*, in moss from Dodder bank, Terenure; *Tachyporus obtusus* var. *nitidicollis*, Santry, etc., common. *Quedius cinctus*, and *Q. molochinus*, under stones, in moss, etc., plantations, Mt. Pelier, Dublin mountains; in the same locality last autumn I took a specimen of *Q. picipes*, a species as far as I can ascertain not previously noted as Irish. *Xantholinus glabratus* and *X. tricolor*, both occurred on the Scalp; *Stenus flavipes*, Santry, etc., frequent; *S. cinctoides*, two specimens in moss from Portmarnock (both species new to Dublin list); *Philorinum sordidum*, Howth; *Scaphisoma agaracinum*, in a rotten stump, Woodlands near Lucan; *Necrophorus mortuorum*, I found a specimen some years ago at Tibbradden; *Hippodamia xiii.-punctata*, Woodlands; *Adalia obliterata*, common by sweeping under Conifers, Santry, Lucan, etc.; *Halyzia xvi.-guttata*, off Conifers, in the Lucan demense; *H. xviii.-guttata*, Tolka Valley, Phoenix Park, etc., much rarer than *H. xiv.-guttata*; *H. xxii.-punctata*, frequent, Santry, Portmarnock (very common), etc., *Telmatophilus caricis*, quarries near Raheny, sweeping; *Paramecosoma melanocephalum*, one specimen in flood-refuse from Tolka (both this and the former species are new to the Dublin list); *Aphodius rufescens*, Scalp, etc.; *A. porcus*, Woodlands, one specimen (new to Dublin list); *Geotrupes spiniger*, near Dublin; *Corymbites quercus*, occurred in the Lucan demense; *Telephorus nigricans* var. *discoideus*, by sweeping at the edge of a small stream, Tibbradden; *Telephorus thoracicus*, Royal Canal bank near Blanchardstown, a local species in England (new to Dublin list); *Malthodes atomus*, Santry, a few specimens, sweeping low plants; *Priobium castaneum*, Malahide; *Gastrophysa polygoni*, local, Santry, Tallaght, etc.; *Lochmæa suturalis*, Howth and Bray Head; *Crepidodera rufipes*, locally common, Lucan, etc.; *Psylliodes cuprea*, Portmarnock; *Cassida flaveola*, Santry, sweeping, last June (new to Dublin list); *Crypticus quisquilius*, shore near Sutton; *Salpingus castaneus*, Santry, one specimen, sweeping under Conifers (new to Ireland); *S. aratus*, local, Tibbradden and Blanchardstown; *Rhinosimus ruficollis* and *R. viridipennis*, Santry, under moss on an old tree stump, last December (the former is new to Dublin, and the latter, of which only two specimens occurred, is apparently new to Ireland); *Otiorrhynchus maurus*, locally abundant, Santry, Portmarnock, etc., I noticed it very common last summer; *Barypeithes sulcifrons*, Boh., one specimen, Woodlands; *Polydrusus chrysomela*, several last May, from under stones at one spot on the shore, near Sutton, a little above high-water mark, it is, I think, very local, and only occurred to me at the one place (I cannot find any previous Irish record for this interesting species, but I believe Mr. Ray Hardy has taken it in Co. Kerry). *Phyllobius pomonæ*, Portmarnock; *Barynotus Schonherri*, Royal Canal bank; *B. elevatus*, in moss from Santry; *Hypera pollux*, Santry,

rarer than *H. rumicis*; *H. trilineatus*, Tallaght. *Orchestes ilicis*, occurred twice in the Lucan Demesne (new to Ireland); *Bagous alismatis*, occurred in the Royal Canal, last summer; *Gymnetron labilis*, in numbers on a railway bank near Portmarnock (new to Dublin list); *Anthonomus ulmi*, Portmarnock; *A. rubi*, frequent, Lucan, etc.; *Ceuthorrhynchus ericæ*, Howth and Bray Head, common; *C. litura*, I obtained this species off thistles, in several localities, Portmarnock, Santry, Castleknock, etc.; Mr. Cuthbert has taken it at Maynooth, and Rev. W. F. Johnson in Co. Donegal; it is remarkable how such a conspicuous insect could have been so long overlooked; *Ceuthorrhynchidius floralis*, in moss, Dodder bank, Terenure; *Eubrychius velatus*, I found this interesting species at Santry by sweeping near a pond, in early summer, and again, last November, it occurred in large numbers in the chinks and under the bark of pieces of wood left on the mud at the edge of the pond (new to the Dublin list); *Magdalis armigera*, Santry last summer I took one specimen off a young birch tree, and recently another off elm. (I cannot find any other Irish record). Its occurrence on the above-mentioned trees is worth recording, as in England it is usually obtained in dead twigs and hedges.—J. N. HALBERT, Dublin.

BIRDS.

Flock of Wild Geese at Kingstown.—When on the platform of the Kingstown railway station on Friday the 21st ult., during the regatta, my attention was called to a flock of Wild Geese which was passing over the Club House (R. St. George), going S.E. There were seven geese going in single file. It is the first flock I have seen under the circumstances, and the passage of these birds during the month of July may be a matter worth bringing under the notice of naturalists; hence my short note.—J. P. O'REILLY, Dublin.

Sand Martins nesting in a Ruin.—Mr. R. Warren writes to *Zoologist* for August that during last week in June he observed a number of Sand Martins nesting in deep crevices between the stones of the ruined castle on Garrison Island, Lough Cullen, Co. Mayo.

GEOLOGY.

Ctenacanthus denticulatus, M'Coy.—To the geological collection of Belfast Museum there has lately been added a specimen of a fossil fish spine representing *Ctenacanthus denticulatus*, M'Coy. For this species the late Mr. Davis, in his valuable monograph of the fishes of the British Carboniferous Limestone, records only one locality, namely—"Monaduff, Drumlist, North of Ireland,"¹ Monaduff is not in the North of Ireland: the correct citation is Monaduff, Drumlish, Co. Longford. The Memoirs of the Irish Geological Survey give us very little palæontological information as to this place. They do not record this species, but mention is made of undetermined fragments of fish remains at Monaduff. The exact locality is Monaduff, quarries on south side of road to Arvagh, about two miles north-east of Drumlish. The specimen now in Belfast Museum is from the Carboniferous shales at Cultra, Co. Down. It is from the collection of the late James MacAdam, F.G.S., and has been presented by his brother, Mr. Robert MacAdam. The genus *Ctenacanthus* is stated by Davis to occur only in the shales underlying the Coal Measures and this holds good so far as our specimen is concerned. The rocks at Monaduff are described in the Survey memoir as dark gray sandy shales and flags, a description which answers equally well for the Cultra locality. Another resemblance is the occurrence of *Modiola MacAdamii* at Monaduff, so that both lithological and palæontological characters indicate that the beds exposed in Longford and in Down are of similar age.—S. A. STEWART, Belfast.

¹ Davis, *Scient. Trans., Roy. Dublin Soc.*, part 25, 1883.

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RARE PLANTS IN WEST CORK.

BY R. A. PHILLIPS.

DURING the last fortnight in July, I spent a few days in the neighbourhood of Castletown-Berehaven and Adrigole, with the object of collecting, and to see growing for myself some of the very rare plants which have been recorded from that district.

On my first day at Castletown I visited the pretty little waterfall of Millcove, about one and a-half miles from the town, and in the wood through which the fall is approached was agreeably surprised to see on a damp spot, a luxuriant patch of *Juncus tenuis*, Willd. The following day I again found the same plant in a very similar habitat in the woods at Dunboy, about four miles south-west of the last station. In both of these localities the rush grew sparingly. During the next few days I met with it in abundance near Adrigole, about eight miles east of the first station. Here it was not so luxuriant as in the woods, and occurred principally on damp roadsides, and bare spots by the sides of streams, not in the turf, associated with such plants as *Cicendia filiformis*, *Anthemis nobilis*, *Eufragia viscosa*, *Scutellaria minor*, *Juncus bufonius*, and *J. lamprocarpus*.

This is one of the rarest of British plants, and in Ireland has hitherto been known to exist only in a few places along the estuary of the Kenmare River, where it was first found by Mr. R. W. Scully, and it is with much pleasure that I now record it as an addition to the Flora of Co. Cork.

The other plants which I noticed have all been recorded from the county before, but some of them are new to the Castletown district. Among the more interesting may be mentioned *Arbutus Unedo* and *Trichomanes radicans*, two species which are probably on the eve of extinction in Cork. Of the first I saw seven trees on Adrigole Mountain; they all

grew in the clefts of high rocks, and, as might be expected in such situations, were rather stunted in appearance.

The *Trichomanes* I saw growing sparingly on two mountains near Adrigole. This beautiful fern and its value are now well-known to every peasant in the district, and many places were pointed out to me from which it has been exterminated within the last few years.

Near Adrigole I discovered a new station for *Asplenium lanceolatum*, but lest it should, like the Killarney Fern, suffer the penalty of its rarity, and fall a prey to the Glengariff guides and tourists, it will perhaps be better not to describe the exact locality.

On the mountains and also near the sea-level, *Saxifraga umbrosa*, *S. hirsuta*, and *S. Geum* were abundant, and on Hungry Hill were quantities of *Saxifraga stellaris*, which in this station assumes a large, hairy form, very different in appearance from English and other specimens I have seen. It was in a viviparous condition on wet rocks at about 1,000 feet, and particularly luxuriant on the turfy sides of a stream which runs through the bog at the summit of the mountain. On Hungry Hill I also gathered *Sedum Rhodiola*, *Solidago virgaurea* var. *cambrica*, *Antennaria dioica*, *Lobelia Dortmanna*, *Campanula rotundifolia*, *Melampyrum pratense* (a peculiar dwarf variety), *Pinguicula vulgaris*, *Littorella lacustris*, *Empetrum nigrum*, *Eriophorum vaginatum*, *Hymenophyllum Wilsoni*, *Lycopodium Selago* and *Isoetes lacustris*.

On the lowland bogs and pastures were to be seen in abundance *Drosera intermedia*, *Hypericum elodes*, *Cicendia filiformis*, *Eufragia viscosa*, *Scutellaria minor*, *Pinguicula grandiflora*, *P. lusitanica*, *Euphorbia hiberna* (well known in the district by the name of "Bonnik-æan"), *Rhynchospora fusca*, *R. alba*, *Carex extensa*, *Lastrea æmula*, and, not quite so plentiful, the white varieties of *Calluna vulgaris* and *Erica tetralix*, *Carex punctata*, and *Lastrea Oreopteris*.

The most notable wayside plants were *Chelidonium majus* (near a house), *Silene anglica*, *Agrimonia odorata*, and *Anthemis nobilis*.

Such are a few of the rarities observed during a short stay in a district which is as full of interest for the lover of the picturesque and the antiquary as it is for the lover of nature.

THE CROSSBILL, AT BALLYHYLAND, CO. WEXFORD.

BY C. B. MOFFAT.

ACCORDING to Mr. Ussher's recent report on the breeding range of birds in Ireland (*R.I.A. Proc.*, (3), vol. iii.), the large numbers of Crossbills observed in this country in 1888-90 have diminished. As the Crossbill is now (August, 1894) more plentiful in this part of the County Wexford than I have ever before known it, I think a few notes on the subject of its visitations to our neighbourhood may be worth communicating.

During the period indicated as that of the Crossbill's maximum abundance in Ireland (1888-90), I saw it at Ballyhyland but once, viz., in October, 1889, when I came on a company of some fifteen birds eating Larch-seed in trees by a roadside. But a flock of ten which I saw similarly employed in the woods on January 15th, 1891, may, for aught I know, have previously frequented the vicinity for great part of the autumn and winter months of 1890, during which I had been absent and could not have discovered them. Again leaving for Dublin on January 17th, not to return till mid-June, I saw no more of these birds; and careful search during the summer and winter of 1891 failed to give any indications of their presence.

But on August 12th, 1892, noticing a footpath strewn with green Larch-cones freshly hacked after the characteristic manner of the Crossbill, I looked around more carefully, and in a few minutes saw a party of the birds feeding near me. Further investigation during the next few days revealed the presence of several small flocks of Crossbills in different parts of the woods. There were companies of seventeen, of twelve, of three, and probably others, each party having its favourite feeding grounds, where it might be found almost at stated hours daily. The regularly-frequented trees were all Larches. At odd times I saw a few Crossbills making a meal of Scotch Fir-cones, or lighting on little patches of ground sprinkled over with the débris of such a feast. But at no time of their residence with us, which lasted for at least five months, and probably longer, did they make more than an occasional repast in any coniferous tree except the Larch.

I had many opportunities of watching these birds during August, September, and October, and again (after a two

months' absence on my own part) during some weeks of December and January. By New Year's Day or thereabouts several males had begun their song, and I hoped they would breed. However I left the place too soon to make sure, and when I returned, late in July, all the Crossbills had vanished. From the somewhat recent aspect of the litter they had left in two or three spots, I thought it likely enough that some had stayed through the nesting-season.

Between July, 1893, and July, 1894, though not at Ballyhyland except now and then for a few days at a time, I think I am safe in saying there were no Crossbills resident here. In June last a few Larch-cones marked with their recognizable imprint suggested that a family party had travelled by and snatched a meal *en passant*, but nothing more. I was therefore agreeably surprised, after coming down here on the evening of July 28th, in the present year, to see next day four Crossbills fly across the avenue. Going into the woods on the day following, I immediately came on another party of three. Shortly after a flock of some thirty passed overhead, and numerous patches of ground strewn with the recently broken green cones of the Larch plainly told that Crossbills had returned in full force. In fact it was very soon apparent that their forces had much increased since 1892, for though most of the parties observed were small (twos, threes, fours, fives, &c.), the wild "chip, chip, chip" of the bird was continually calling attention to its presence, as a little company flitted from one feeding station to another; and it was quite impossible to form an estimate of the number of such small family parties, as I found them in every plantation in the neighbourhood.

These details may seem dry and unsuggestive, but they are not, I believe, without their bearing on the history of the Crossbill's migrations. During the summer of 1890 the harvest of Larch-cones at Ballyhyland was abundant, and the birds which I saw in the course of the ensuing winter were evidently making these cones their staple diet. In 1891, on the contrary, the Larches very generally failed to produce cones,—as the Beeches, the same year, totally failed to bear mast,—and though Pine-cones were as plentiful as usual we had no Crossbills that season. In 1892 the crop of green Larch-cones was abundant, and the Crossbills returned, remaining the autumn and winter, and possibly the spring. But in 1893

again the Larches were unproductive, and by July the Crossbills had left us, not to appear certainly earlier than June, 1894. This summer we have again a rich abundance of Larch-cones, and here we have again the Crossbills feasting upon them, in greater numbers than ever.

Thus the experience of five seasons tends strongly to confirm the view that the Crossbill's migratory movements are determined by local variations in the supply of its favourite diet. The cones of *Pinus sylvestris* (the Scotch Fir) have been plentiful every year at Ballyhyland during the period under notice. Hence it is clear that the Crossbill (whose Scandinavian kinsmen have to subsist mainly on cones of this pine) was not seriously pressed for food, but was merely gratifying a preference in quitting our woods in 1891 and 1893 for other haunts, where he may have found Larch-cones in sufficient abundance for his liking.

So full an account of this bird's habits has already been given in the pages of the *Irish Naturalist* (vol. i., p. 8., &c.), by Mr. R. J. Ussher that I am reluctant to occupy space with further details. But I subjoin a few observations with reference to its feeding habits, because these afford much the readiest indications of the bird's presence in any given locality, and because I have reason to think the Crossbill, in spite of its brilliant plumage, tame character, and noisy manner during flight, is still a bird which very commonly eludes observation, even in districts where its stay has been more or less protracted.

The crackling noise which Crossbills make in the trees when a number of them are feeding is frequently alluded to, but it should be added that this is audible as a rule only in winter, when the cone-scales are crisp; and during the summer months any person unaccustomed to distinguish birds by their call-notes is likely to overlook the presence of even a considerable number of Crossbills, unless he observes and guesses at the meaning of the litter of cones under their feeding-trees,—an unfailing clue, when once understood.

The only other common denizens of our woods which habitually wrench off entire cones before proceeding to extract their seed are the Rook and the Squirrel, both of which act quite differently from the Crossbill, as well as from one another. The Rook carries off the green cones of the Scotch

Fir in large numbers, and hacks away the exterior bit by bit, so clumsily that one may pick up a dozen on which he has operated without finding one whose seeds he has reached. The Squirrel's mode is to snip off the scales, dropping a denuded core to the earth. The Crossbill pursues a method peculiar to himself. The cone which he lets fall, if a Larch cone, is marked simply by two longitudinal gashes cut from near the centre to the edge of each scale. If a Pine-cone, it presents an aspect more illustrative of the bird's mechanical power—the scales being all completely loosened, and hanging disjointedly like the appendages of a rattle. At first sight one would imagine that totally different methods had been employed in extracting the seeds of the two trees. The difference, however, is not in the Crossbill's *modus operandi*, but in the stage at which the scales of the cone yield to it. Those of the Larch (as might be expected of a tree whose seeds the Goldfinch, Siskin and Lesser Redpole so easily extract) at once suffer the points of the Crossbill's inserted mandibles to pierce their tissue, and thus escape being loosened at the base by main pressure. The toughness of the Pine-scale is the *raison d'être* of the Crossbill's peculiar formation, and the same act on the bird's part which rends into ribbons the scale of the Larch merely disturbs and forces upwards that of the Pine.

On one unimportant particular, I must venture to differ from Mr. Ussher, who states (*Irish Nat.*, vol. i., p. 9) that a Crossbill commences to work a cone at the apex. I have watched the operation many times, and have invariably found the commencement to be at the base of the cone. I have also picked up scores of cones which had been dropped unfinished; in all these, without exception, the scales of the large end had been lacerated, and those at the small end left entire.

In September, 1892, I was for some time much puzzled over the voice of a bird I heard singing in the woods by night, at full moon. Eventually it proved to be the Crossbill, to whose

“Songs, like legends, strange to hear,”

I thus listened, for the first time, under somewhat unwonted conditions.

THE IRISH FIELD CLUBS.

BY R. LLOYD PRAEGER, B.E.,

Secretary, Dublin Nat. Field Club ; Ex-Secretary, Belfast Nat. Field Club.

II.—THE DUBLIN NATURALISTS' FIELD CLUB.

It might have been more appropriate that this short history of the Dublin Field Club should have been written by Professor Haddon, its founder, or by some other of the eminent men of science who have watched over it from its infancy, and still take an active interest in its welfare ; but though I cannot write of the early days of the Club from personal recollection, the minute-book lies open before me, so I trust that at least I shall not err as to fact, however wanting my account may be in regard to sentiment.

The conditions under which the Dublin Club came into existence were widely different from those which I have already described as attending the birth of the Field Club of Belfast. Firstly, there was the lapse of nearly a quarter of a century, bringing with it a more general interest in, and sympathy with science, and scientific research. And secondly, Dublin had the good fortune to possess a comparatively large body of trained scientific men, and also societies, schools, and museums eminently favourable to the acquisition of scientific knowledge—advantages which were almost entirely wanting when the hard-working citizens of the northern capital founded their Club. It is quite possible, however, that the foregoing circumstances had a deterrent effect as regards the founding of a Field Club in Dublin, for, while they were undoubtedly conducive to the imparting of a more general interest in science, and of a love of natural history pursuits, they at the same time supplied, partially at least, the opportunity for scientific intercourse and study which it is the main object of a Naturalists' Field Club to confer, and rendered less necessary the banding together of persons scientifically inclined, for the promotion of their favourite pursuits.

However this may be, it was early in the winter of 1885-6 that Professor Haddon, of the Royal College of Science, suggested the formation in Dublin of a Naturalists' Field Club, and the suggestion appears to have met with immediate favour. A preliminary meeting was held by private invitation in the

biological laboratory of the College of Science on December 18th, about twenty persons being present, and it was followed by a public meeting, convened by advertisement, in the theatre of the Royal Dublin Society on January 11th. Dr. E. Perceval Wright occupied the chair, and a provisional code of rules, which had been framed on those of the Belfast Club, was adopted, and officers for the ensuing year were elected. The first President was Professor Wright; Vice-president, Professor Haddon; Secretary, Greenwood Pim; Treasurer, R. M. Barrington; Committee, Wm. Archer, V. Ball, F. W. Burbidge, Rev. M. H. Close, H. C. Hart, W. F. de V. Kane, F. W. Moore, A. G. More, Professor M'Nab, Professor O'Reilly, Professor Sigerson. The list of members who entered their names at this meeting numbers 99, and the Club entered on its career with every indication of success. The Royal Irish Academy generously placed their fine rooms at the disposal of the Club for the purpose of evening meetings, a privilege which the Club has enjoyed ever since, and which is duly appreciated. The first summer excursion was made to Howth on May 22nd, and was attended by about 75 persons, a number which has not, I believe, been equalled on any excursion held since. The first annual report of the Committee, laid before the members at the annual meeting held on 22nd January, 1887, shows that five evening meetings were held during the year, and five excursions, one excursion being abandoned owing to bad weather. The membership stood at 172; the officers, with the exception of three of the Committee, were re-elected; and the Club entered on the second year of its existence.

The novelty of the excursions and evening meetings had by this time worn off, and at the close of a rather uneventful year it is not surprising to find the Committee, in their second annual report, urging strongly on members the desirability of showing a more active interest in the Club's operations. With Mr. Greenwood Pim as President, Dr. M'Weeney as Secretary, and a decreasing membership of 149, the Club commenced its third year, which was destined to bring with it a severe crisis in the Society's fortunes. The attendance of members at the excursions of this season (1888) was so unsatisfactory that after due deliberation the Committee determined to bring before the members a resolution authorizing the winding up of

the Club, "in order (to use the words of the ensuing annual report) to ascertain whether they set any value on its continued existence," and this was done at a general meeting held on 20th November, 1888. This momentous action proved the turning-point of the Club's fortunes. The resolution was vigorously opposed by a number of members, offers of assistance at the coming winter meetings were tendered, and so evidently was the feeling of the meeting against the termination of the Club's existence, that the resolution was withdrawn. At the succeeding evening meeting the attendance of members was considerably larger, and the greater interest shown in the agenda proved that the dormant energy of the members had been aroused.

The third annual meeting was held in January, 1889. The report then presented contained, of course, a full reference to the critical events of the previous year; beyond this, there was but little to call for remark, so much had the lack of interest shown by members hampered the usefulness of the operations of the Club. At this meeting, Dr. Scharff succeeded Dr. M'Weeney as Secretary; the other officers were re-elected; the membership was reported as 94.

The fourth year of the Club's existence brought a decided revival of interest among members. The attendance at winter meetings showed an encouraging increase, as also did the list of members who read papers or exhibited objects of scientific interest; and the summer excursions also received an augmented amount of support; so that the Committee were able to render at the end of the year a satisfactory account of their stewardship, and to report, for the first time since the foundation of the Club, a slight increase of membership. At the beginning of the fifth year (1890), Professor Haddon succeeded Mr. Pim as President; the Secretaryship devolved on Mr. G. H. Carpenter; and Mr. Barrington relinquished the post of Treasurer, which he had held since the Club was founded, Mr. R. S. Chandlee being elected in his place. Thus officered, the Club continued to make satisfactory progress. The excursion programme was successfully carried out, with an average attendance of about 35 members; during this year there was an increase both in the number of excursions held and in the amount of field-work which was done on them; and the attendance at the winter meetings was most satisfactory.

In their report for 1891, presented at the sixth annual meeting, 12th January, 1892, the Committee are again able to record an increase in the roll of members, which now numbers 109. On account of the lamented death of Mr. Chandlee, Mr. J. E. Palmer undertook the duties of Treasurer. It may be noted that in this year the experiment was tried of holding small extra excursions for the study or collecting of particular groups of plants or animals by those specially interested in them. During the first year of the Club's existence a similar scheme had been attempted, a number of sections having been started, each devoted to the study of some special department of natural history; but in neither instance was the scheme carried out for more than a single season; probably a much larger membership would be necessary before such a scattering of the limited scientific resources of a small Field Club would be either advisable or successful.

Dr. M'Weeney was elected President for the year 1892; the other officers were re-elected, and the Club continued to prosper. It was early in this year that the suggestion was made by Mr. Carpenter that a magazine devoted to Irish natural history should be founded; and from the first, the Dublin Field Club showed an active and friendly interest in the undertaking, and the existence of the *Irish Naturalist* in its present form is largely due to their prompt sympathy and generous assistance.

At the beginning of 1893 the Club numbered 126 members; Mr. J. M. Browne succeeded Mr. Carpenter as Secretary, and Professor Johnson, Mr. Palmer as Treasurer. Once again there followed a year of steady progress, the most noticeable events being the opening of the winter session with a *Conversazione*, which was in every respect successful, and will probably become an important annual event, as it is with the Belfast Club; and a three-day excursion to the neighbourhood of Newry and Carlingford, carried out in conjunction with the Belfast Field Club, which was considered, by those members who had the good fortune to be present, to be one of the most enjoyable and instructive trips which have, so far, been held by either of the Societies engaged.

And this brings us to the beginning of the present year, when Mr. Carpenter succeeded to the Presidential chair, with Professor Cole as Vice, and the present writer was elected to

the vacancy in the Secretaryship caused by the retirement of Mr. Browne. At the commencement of the year the membership was 128; since then, the increase steadily continues, so that at the time of writing it has reached 160. The summer excursions, now drawing to a close, have been enjoyable and instructive, and the pleasant re-unions with the Belfast Club at the Boyne, and with the Cork and Limerick Clubs at Fermoy, will not soon be forgotten. The Dublin Naturalists' Field Club has a successful and useful future before it, and especially hopeful are the prospects of a better knowledge of, and a closer bond of union with our fellow-Clubs of the north and south. May we all feel, and may we be encouraged by the thought, that there is a fair field before us, and that we are fellow-travellers in the march of scientific progress, able and willing to help ourselves and to help each other.

MATRICARIA DISCOIDEA, DC., IN IRELAND.

BY NATHANIEL COLGAN.

ON the 22nd of August last, while botanizing in the Dublin Mountains, I gathered an unfamiliar rayless composite growing on a granite freestone track alongside the Rathmines Waterworks Reservoir at the head of Glenasmoil. Two days later, the same plant turned up, quite unexpectedly and in much greater abundance, on the footpath of the Glenamuck road, near Carrickmines, fully seven miles distant from the first station; and, once again, on the 29th August, I came across it growing in an angle of waste ground at Lispopple cross-roads, eighteen miles distant from Glenasmoil. On examination the plant proved to be *Matricaria discoidea*, DC. The Carrickmines specimens agreed perfectly with the description in the *Prodromus* (vi. 50), the seed-apex being naked or obscurely crowned. In the Glenasmoil and Lispopple plants, however, the seed was crowned with two distinct teeth, tightly clasping the floret so as to render it quite persistent. This toothed form of the seed, not mentioned in the *Prodromus*, is well described in Asa Gray's "Flora of North America," 1886, p. 364, where it is stated that the seed-crown "is occasionally produced into one or two conspicuous, oblique auricles of

coriaceous texture," and in my County Dublin specimens this toothed or auricled seed appears to be correlated with a marked difference of habit in the plants which produce it. They are upright and stronger in growth than the variety bearing the uncrowned seeds, which is quite procumbent.

The distribution of the species is thus given by Asa Gray: "West California to Unalaska and Behring Island, E., to Montana, and becoming naturalized in the Atlantic States, near railroad stations (N. Asia and nat. in N. Eur.)" According to Wyman's *Conspectus* the plant occurs in many places in Northern and Middle Europe, where it is thoroughly naturalized. Hartmann ("Skandinaviens Flora," 9 Ed. 1864), records it as then found in streets and cultivated places in Christiana, Upsala and other stations. Willkomm ("Pflanzenreich Deutschlands," 1882), records it from the following German stations: around Berlin, Frankfort-on-Oder, Breslau, Dresden, Prague, and Constance. On consulting the herbarium of the late Dr. Moore in Glasnevin Botanic Gardens, Dublin, I find a specimen of the plant labelled: "Between Richmond and Kew, J. G. Baker, July, '71," so that the plant has been observed in England, in a suspicious locality, indeed, and perhaps as a mere casual, twenty-three years ago. But it does not appear to have gained ground in England, up to 1884, at least; for no mention of the plant is made in the appendix of excluded species in the last edition of Hooker's "Student's Flora." Quite recently (September 3rd), Dr. Leitch, of Sillioth, has shown me specimens of a puzzling ballast plant gathered by him at Falmouth on his way by sea from London to Dublin. This plant is undoubtedly *M. discoidea*, DC., and Dr. Leitch tells me it is abundant in the Falmouth station. It would be of no small interest to know what is the present English distribution of the species. In County Dublin it cannot be regarded as a ballast plant, the stations of Carrickmines, Lispopple, and Glenasmole, being respectively two and a half, four, and ten miles distant from the nearest sea. In all these stations it ripens seed perfectly, and it may be that this interesting, but by no means handsome, stranger has come to stay in Ireland, as it has in Scandinavia and Germany.

IRISH MOTHS.

A Catalogue of the Lepidoptera of Ireland. BY W. F. DE V. KANE, M.A. *Entomologist*, 1893-4. (Sphinxes and Bombyces from September, 1893, to July, 1894.)

Six years' Entomology in Co. Galway. BY HON. R. E. DILLON. *Entomologist*, March, May, and June, 1894.

In the *Irish Naturalist* for March (p. 56) we noticed the commencement of Mr. Kane's valuable list, and summarised the result of his work on the Irish butterflies. By this time he has dealt with the families of moths generally known as "Sphinxes and Bombyces," and his account of their Irish representatives will be gladly welcomed by entomologists here and in Great Britain. A comparison of the new list with Birchall's shows that Mr. Kane has found it necessary to expunge not a few erroneous records, as well as to add new species. Of the hundred and fifty-one British Moths in the families under consideration, just a hundred were inserted in the Irish list by Birchall. Two of these—*Ocnèria dispar* and *Pygæra anachoreta* owed their places only to caterpillars which the recorder himself turned out, the former on the Killarney moors, the latter at Howth; consequently they have no more right to be considered Irish animals than the Fallow Deer in Phoenix Park, or the Black Swans in St. Stephen's Green, have to rank among the vertebrates of County Dublin. Thirty years ago the importance of an accurate knowledge of animal distribution was not recognised, but to-day a wilful falsification of the geographical record should be considered a serious offence by naturalists; we are somewhat shocked to find that Mr. Kane not only fails to reprobate such a proceeding, but confesses to have himself let loose larvæ of *O. dispar* in County Sligo!

Of the ninety-eight remaining species of the 1866 list, four—*Deileophila euphorbiæ*, *Clisiocampa castrensis*, *Notodonta bicolor*, and *N. trilophus*—were withdrawn by Birchall in 1873, and three others—*Sesia culiciformis*, *Lithosia complana*, and *Sarrothripus undulatus*, were added. Mr. Kane confirms these additions, and re-instates *Notodonta bicolor*. But he omits so many as fifteen of Birchall's moths—*Sesia formiciformis*, *Hepialus lupulinus*, *Nola cucullatella*, *N. strigula*, *Lithosia mesomella*, *Callimorpha dominula*, *Arctia villica*, *Porthesia chrysorrhæa*, *P. similis*, *Psilura monacha*, *Endromis versicolor*, *Lasiocampa trifolii*, *Cymatophora octogesima*, *Asphalia diluta*, and *A. flavicornis*—some of which were even recorded in 1866 as "common." We conclude that Mr. Kane has, in each case, information which has inclined him to regard the determination as untrustworthy, and that he has failed to confirm the insect's occurrence in Ireland by personal observation. It seems however that *Hepialus lupulinus* must be replaced in the list, as Mr. C. G. Barrett states, in the second volume of his work on British Lepidoptera, now in course of publication, that he has himself taken this species in County Galway.

The various additions which have from time to time been made to Birchall's list have been investigated by Mr. Kane, with the result that some, specially among those recorded by the late Mr. Sinclair in the *Sri*.

Proc., R.D.S., 1879, are rejected as erroneous or untrustworthy, while others are adopted and incorporated. This sifting process is of the greatest value, as a reliable basis is thus afforded upon which future investigators can build.

Against the omissions, Mr. Kane has ten species to add to Birchall's list. These are *Smerinthus tiliæ*, *Sesia musciformis*, *Zygæna loniceræ*, *Nachia ancilla*, *Deiopeia pulchella*, *Zeuzera pyrina*, *Macrogaster castaneæ*, *Heterogenea limacodes*, *Dasychira fascelina*, and *Ptilophora plumigera*. No less than six of these are due to the work of Mr. R. E. Dillon at Clonbrock, County Galway, who also has published, in a separate list, his more remarkable captures in that phenomenal locality. The occurrence of some of these species in the West of Ireland is so startling that it is to be regretted that the earlier among them were published by Mr. Kane, without the name of their captor, thus giving an air of mystery to the records, which might lead to doubt on the part of some. We observe, indeed, that Mr. C. G. Barrett has not noticed them in his work, already referred to. It is now, however, a satisfaction to know to whom we are indebted for the discovery of such rarities, and Mr. Dillon may rest assured that the open publication of his work is well worth "the risk of attracting undesirable collectors" which he deprecates. Startling as some of these additions are, Mr. Kane's well-known carefulness is sufficient guarantee that no mistakes have arisen through a mixing of Irish with English or Continental specimens in Mr. Dillon's cabinet.

Of these additions, the most remarkable is *Nachia ancilla*, an insect which appears only in the "reputed" British list on the strength of a single occurrence at Worthing in Sussex. The family—*Syntomidae*—to which it belongs is otherwise unrepresented in Britain. The circumstances of the capture, in an old oak wood, of Mr. Dillon's two specimens lead Mr. Kane to regard this moth as a truly indigenous species, not—as *Deiopeia pulchella* for example—a chance visitor. The vast amount of deforestation which Ireland has undergone has probably led to the almost total extinction of many woodland insects, the few survivors of which remain to be discovered in favoured or protected localities. Hardly less remarkable is the discovery of *Macrogaster castaneæ* in Co. Galway, considering that in Great Britain it is confined to the eastern fen districts of Norfolk and Cambridgeshire.

Mr. Kane has much of interest to record on the variation of certain species in Ireland. It appears that all our "Galway Burnets" must be referred to the var. *nubigena*, and that the typical *Zygæna pilosellæ* is unknown in Britain, contrary to Birchall's opinion. Specially noteworthy, also, are the remarks on the varieties of *Spilosoma mendica* and *Cymatophora or.*

As with the butterflies, we give a summary of Mr. Kane's list of these families of moths, with a few supplementary localities; adding *Hepialus lupulinus* on Mr. Barrett's authority, and *Nudaria senex*, which Col. Partidge has taken at Enniskillen (*Ent. Mo. Mag.*, Dec., 1893.) The number of Irish species thus stands at ninety-five, or about sixty-three per cent. of the British species. The proportion among the butterflies is very nearly the same.

In the light of modern researches it is impossible to regard any longer the "Sphinges" and "Bombyces" as natural groups. By the structure of their larvæ and pupæ¹, as well as by their wing-neuration², the *Sesiidæ*, *Zygænidæ*, *Cossidæ*, *Cochliopodidæ*, and *Hepialidæ* are more nearly related to the *Tineidæ* and *Tortricidæ* than to the families near which they at present stand. In the list as given here, we therefore venture to place these families in a more natural series than that in general use. We use the nomenclature of South's list, except in the case of the "Eggars" which cannot be rightly known as *Bombycidæ*, when the type of *Bombyx*—*B. mori*, the Common Silkworm Moth—belongs to a quite different family.

SATURNIIDÆ.

Saturnia pavonia, L.—Generally distributed; often common.

SPHINGIDÆ.

Acherontia atropos, L.—Generally distributed, but not common.

Sphinx convolvuli, L.—Generally distributed; common in some years.

[**S. ilugstri**, L.—Limerick, Ballymena—records doubtful.]

Dellephila galli, Schiff.—Has occurred twice on the coast of Co. Dublin.

D. livornica, Esp.—Has occurred near Youghal, Killarney, Ennis, Kingstown, Kildare, Trim, and Belfast.

Chærocampa celerio, L.—Has occurred in Co. Sligo.

C. porcellus, L.—Generally distributed; often common, especially near the coast.

C. elpenor, L.—Generally distributed; often common, specially inland.

Smerinthus ocellatus, L.—Local:—Cos. Fermanagh, Armagh, Dublin, Wicklow, Westmeath, Limerick, Galway, Waterford, and Clare.

S. populi, L.—Common everywhere.

S. tillæ, L.—Co. Galway.

Macroglossa stellatarum, L.—Generally distributed; common in warm summers.

M. bombylifformis, Ochs.—Widespread, but local; sometimes abundant:—Cos. Donegal, Antrim, Monaghan, Tyrone, Roscommon, Galway, Sligo, Westmeath, Dublin, Wicklow, Cork, and Kerry.

NOTODONTIDÆ.

Dicranura furcula, L.—Local; sometimes abundant:—Cos. Derry, Donegal, Cavan, Mayo, Galway, Westmeath, and Dublin.

D. bifida, Hb.—Rare:—Cos. Derry and Sligo.

D. vinula, L.—Common everywhere.

Stauropus fagi, L.—Once near Kenmare.

Ptilophora plumigera, Esp.—Once at Clonbrock, Co. Galway.

Pterostoma palpina, L.—Local and rare:—Cos. Tyrone, Cavan, Wicklow, Galway, and Kerry.

¹ T. A. Chapman "On . . . the Pupæ of Heterocerous Lepidoptera . . ." *Trans. Ent. Soc.*, 1893.

² G. F. Hampson, "The Fauna of British India. Moths," Vol. I, 1892.

Lophopteryx camelina, L.—Generally distributed; larvæ often common.

Notodonta bicolor, Hb.—Killarney.

N. dictæa, L.—Not common:—Cos. Antrim, Derry, Dublin, Wicklow, Westmeath, Sligo, Mayo, and Galway.

N. dictæoides, Esp.—Local, but more abundant than the last:—Cos. Donegal, Cavan, Tyrone, Roscommon, Mayo, Westmeath, Dublin, and Wicklow.

N. dromedarius, L.—Widely distributed and common in Cos. Derry, Donegal, Tyrone, Dublin, Wicklow, Westmeath, Sligo, Mayo, and Galway.

N. ziczac, L.—Widely distributed and common, in same counties as the preceding; also Armagh.

N. trepida, Esp.—Co. Wicklow.

N. chaonia, Hb.—Co. Wicklow; Killarney; Clonbrock, Co. Galway.

N. trimacula, Esp.—Killarney.

Phalera bucephala, L.—Common everywhere.

Pygæra curtula, L.—Rare:—Larvæ in Cos. Down, Roscommon, Galway, and Tipperary.

P. pigra, Hufn.—Widely distributed and common:—Cos. Donegal, Tyrone, Leitrim, Down, Westmeath, Mayo, and Galway.

CYMATOPHORIDÆ.

Thyatira derasa, L.—Generally distributed, but not often abundant.

T. batis, L.—Generally distributed; sometimes common.

Cymatophora or, Fb.—Very local and rare:—Cos. Derry, Cavan, Sligo, Galway, and Wicklow.

C. duplaris, L.—Local, and not common:—Cos. Derry, Donegal, Tyrone, Monaghan, Cavan, Fermanagh, Westmeath, Wicklow, Sligo, Mayo, Galway, Cork, and Kerry. All Irish specimens are referable to the var. *argentea*, Tutt.

C. fluctuosa, Hb.—Very rare:—Cos. Sligo and Kerry.

LASIOCAMPIDÆ.

Trichiura cratægi, L.—Killarney.

Pœcilocampa populi, L.—Widely distributed; locally common.

Eriogaster lanestris, L.—Local:—Cos. Derry, Galway, and Killarney.

Clisiocampa neustria, L.—South of Ireland; local:—Cos. Dublin, Waterford, Killarney, Limerick, Clare, and Galway. Also at Enniskillen.

Laslocampa rubi, L.—Common everywhere.

L. quercus, L.—Has occurred only at Queenstown and in Co. Westmeath.

var. *callunæ*, Palm.—Common everywhere.

Odonestis potatoria, L.—Generally distributed, and locally common.

LYMANTRIIDÆ.

Leucoma salicis, L.—Co. Galway.

Dasychira fascelina, L.—Bog of Allen, King's Co.

D. pudibunda, L.—South of Ireland; local, but sometimes common:—Cos. Wicklow, Waterford, Cork, Kerry, and Galway.

Orgyia antiqua, L.—Widespread, but local, and not often common.

(TO BE CONCLUDED).

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Five Lion-cubs were born in the Gardens on August 10th. All are males, an absolutely unique circumstance, and are doing well. Three Capybaras were also born in the Gardens on September 4th. Recent donations comprise a pair of Red-striped Lizards and some Japanese Goldfish from J. B. O'Callaghan, Esq.; two pairs of Skylarks and a Quail from C. J. Wallace, Esq.; a pair of Herring Gulls from Capt. Boxer; and a Sparrow-Hawk from R. Maunsell, Esq. Two Persian Sheep, eight parrots, and ten monkeys have been acquired by purchase. 14,600 persons visited the Gardens in August.

BELFAST NATURALISTS' FIELD CLUB.

AUGUST 11th.—Ballymena, Slemish, and the Braid Valley were visited, the Club's usual good fortune in weather being in evidence all day. Arriving at Ballymena, the party was met by Mr. W. J. Knowles, M.R.I.A., and the Rev. George Buick, local members, who gave much assistance throughout the day. No time was lost in mounting the vehicles and driving through the town, going by the old road past Drumfane Fort to Broughshane, stopping at the esker to examine the sands and gravels. The current-bedding is here finely displayed owing to recent weathering; the softer strata have been taken full advantage of by the Sand-martins, which have burrowed in and made their nests in great numbers. The next halt was made at the pretty little church of Broughshane, to the east of which is the cross-marked grave of the Club's late President, Rev. Canon Grainger, whose kindly welcome and local information were much missed on this, the first occasion of the Club's visit to "Canon Grainger's country" since his demise. The slopes of Slieve Mis (1,437 feet) were soon reached, and its pleasant heights ascended. This is an old volcanic neck, and from its vent doubtless partly flowed that basalt which forms such a prominent feature of our County Antrim surface. At Ballyligpatrick, between Skerry and Slieve Mis, St. Patrick, then a captive youth, herded the flocks of the chieftain Milchu for seven years, and here it was he dreamed those dreams and saw the visions which were subsequently to be realised. The descent from the hill having been made, a pleasant drive brought the party to the ancient Church of Skerry (Sciric), situated on a rocky eminence, as its name denotes. Formerly "stations" were held here, and great crowds assembled round what is known as "St. Patrick's foot-mark," a small depression in an adjoining rock. Close by is the Holy Well called Tubernacool (pronounced *sool*), which Colgan styles "*fons miraculosus*." In this district were found the pretty flower *Gentiana campestris*, and several roses, including the rare *Rosa Sabini* and other interesting plants. The return journey was then made to the Adair Arms, where tea was partaken of, after which the members visited the valuable collection of antiquities belonging to Mr. Knowles, and the fine Parish Church, on the invitation of the rector. Belfast was reached at nine o'clock, bringing back all satisfied with their pilgrimage to the scenes of the early labours of Ireland's patron saint.

DUBLIN NATURALISTS' FIELD CLUB.

AUGUST 11th.—Excursion to Lucan. A party of about twenty proceeded to Lucan Station by 10 a.m. train from Broadstone. Arrived there, the banks of the Canal were immediately invaded, and carefully examined as far as Leixlip, and they yielded a good harvest to the collectors. The most note-worthy plants which grew in the waters or on the margins or slopes adjoining were *Ranunculus Lingua*, *R. circinatus*, *Nuphar luteum*, *Senebiera Coronopus*, *Epilobium palustre*, *Valeriana officinalis* and *Lythrum salicaria* in great quantity, *Sium angustifolium*, *Cenanthe phellandrium*, *C. fistulosa*, *Origanum vulgare*, *Linaria minor* (on the railway), *Typha latifolia*, *Sagittaria sagittifolia*, *Equisetum Wilsoni* abundant, *Chara hispida* f. *rudis*, *C. aspera*, *C. vulgaris*, *C. contraria*, *C. polyacantha*. Near Leixlip *Carduus crispus* and *Reseda lutea* were observed on dry banks, and *Gymnadenia conopsea* and *Parnassia palustris* in a marshy meadow. At Leixlip the party visited the Salmon Leap, near which huge specimens of *Scrophularia aquatica*, some 8 or 9 feet high, were gathered. Thence the route lay down the river bank, through the woods of Lucan demense. *Orobancha hederæ* was found in immense abundance and great luxuriance under the trees by the river bank, and an adjoining pool was fringed with *Carex pendula*, and *Orchis pyramidalis* grew among the grass.

This is usually a very unproductive month for Coleoptera, but thanks to the luxuriant growth of vegetation a few interesting plant-feeding species were taken, numbers of the local *Galerucella nymphææ* occurred on the water-plants in one place near Lucan, *Cassida equestris* (a species widely distributed but local), *Apion Gyllenhalii*, *A. carduorum*, etc., *Sitones flavescens*, *S. lineatus*, *S. tibialis*, *Ceuthorrhynchus pleurostigma*, *C. crysini* and *C. litura*, the last mentioned very common on thistles. The Hemiptera were more plentiful, the best being *Lygus rusticus*, *Nabis flavomarginatus*, *Pithanus Maerkeli* and *Calocoris roseomaculatus*, but the "take" of the day was a single specimen of *Myrmedobia tenella*, Zett., on the Canal bank near Lucan, a species which had not been previously known as Irish, and in England is only known to occur in a very few localities.

Under a spreading Oak tree at the lower end of the demesne Miss Gardiner had an ample tea spread upon the sward, to which full justice was done. Subsequently, a short business meeting was held, Mr. David M'Ardle in the chair, when the following new members were elected—Mrs. Stewart Baskin, Miss M'Intosh, B.A., Miss R. Mahaffy, Miss E. Reynell, Major Gamble, Mr. G. F. Gamble. The party returned to town by the 7.5 steam tram.

LIMERICK NATURALISTS' FIELD CLUB.

JUNE 28th.—Excursion to Lough Gur and neighbourhood—a locality some twelve miles south of Limerick, justly celebrated for its geological characteristics, and the richness and great variety of its archæological remains. Time did not permit a careful examination of the district, the most interesting botanical find being Henbane (*Hyoscyamus niger*), a fine specimen in full bloom having been gathered by Mrs. R. Gibson.

AUGUST 6th.—Excursion to Broadford, Co. Clare, one of the very few fine days of the month. The marshy meadows and peat bogs skirting Doon Lake yielded Marsh Epipactis (*Epipactis palustris*), Spotted Orchis (*Orchis maculata*), Marsh Parnassia (*Parnassia palustris*), Yellow Loosestrife (*Lysimachia vulgaris*), Water Mint (*Mentha aquatica*), Gipsywort (*Lycopus europæus*), Marsh Thistle (*Carduus palustris*), Sundew (*Drosera rotundifolia*), Reed Mace (*Typha latifolia*), Bur-reed (*Sparganium ramosum*), Lichen Cornutus (*Claadonia coccifera*), &c., &c. Larvæ of the Pebble Prominent Moth (*Notodonta ziczac*), and pupæ of the Bullrush Moth (*Nonagria arundinis*) formed the most interesting entomological records of the day.

NOTES.

ZOOLOGY.

INSECTS.

Vespa arborea (austriaca).—Further Records.—I captured a queen of this species about the middle of last July, in the nursery garden, Monkstown, and another was taken, somewhat earlier, by Mr. Freke at Dundrum. Both Mr. Freke's specimen and mine were taken in company with *V. sylvestris*. The identity of our *V. arborea* with the Continental *V. austriaca* can only be fully confirmed by the discovery of the male. The best way to secure this would seem to be by examination of the nests of *V. sylvestris*, if, as seems probable, *V. arborea* be really an inquiline species inhabiting the nests of the former.—H. G. CUTHBERT, Blackrock, Dublin.

Cimbex femorata, Linn. In Co. Dublin.—Examination of the British Museum collection has convinced me that the male *Cimbices* taken by Mr. J. J. Dowling (p. 176), are remarkably large examples of this species, and neither *C. connata*, nor American immigrants as I at first supposed. Mr. Dowling has kindly written to inform me that the insects were taken at Foxrock, not at Stillorgan.—GEORGE H. CARPENTER.

The Brown Hairstreak (*Thecla betulae*) In County Wexford.—In Mr. Kane's list of Irish Lepidoptera, Munster and Galway are mentioned as this rare British Butterfly's Irish habitats. It is an insect of annual occurrence in Killoughrim Forest, Co. Wexford, from which locality I sent Mr. Kane a male and a female in 1889. Mr. Kane, in his reply, was good enough to inform me that they were the only Irish specimens of *Thecla betulae* he had seen: so the omission of Co. Wexford from his list must be due to an oversight. I have picked up with my finger and thumb four of these Butterflies in succession while walking through the forest without a net. In some seasons, however, they are by no means so easy to obtain. Other local Irish Butterflies which frequent Killoughrim Forest and its outskirts are the Purple Hairstreak (*Thecla quercus*), Greasy Fritillary *Melitaea aurinia*, and Dingy Skipper (*Nisoniades tages*).—C. B. MOFFAT, Ballyhyland,

The small Heath Butterfly (*Cœnonympha pamphilus*): Single or Double-Brooded?—I cannot agree with a remark I see made in the February number (p. 44) by Mr. C. W. Watts, that *Cœnonympha pamphilus*, though regularly double-brooded in England, is in Ireland usually single-brooded. I do not doubt its being single-brooded in Ulster, but should be surprised to learn that southern observers consider it so in their districts. In Wexford it is a normally double-brooded insect, appearing about the end of May and end of July. This year the second brood was freshly out in profusion on July 30th. In 1886, however, I find August 14th noted as the date of its emergence; while in other years I have such dates as August 31st and September 8th mentioned as those on which the latest specimens were observed. The question of this Butterfly's single or double-broodedness is one on which it would doubtless interest many readers of the *Irish Naturalist* to have a comparison of notes from various districts, north, south, and midland.—C. B. MOFFAT.

The Hornet Moth (*Trochilium crabroniformis*, Cl.) In Co. Cork.—On July 21st while botanizing near Berehaven I captured a good specimen of this very pretty insect. Mr. Carpenter, who has kindly confirmed my determination of the species, states that it has not been previously recorded for this county.—R. A. PHILLIPS, Cork.

Coleoptera at Courtown, Co. Wexford.—On a recent trip to Courtown, Co. Wexford, Mrs. Tatlow was kind enough to collect what Coleoptera she met with during her stay. In the collection thus made are some examples of the local *Bembidium pallidipenne* taken under debris at the mouth of the river north of Courtown; there are also *Nebria complanata*, *Anchomenus marginalis*, *A. oblongus*, *Pterostichus vernalis*, *Staphylinus cæsarius* and many other species of more common occurrence.—J. N. HALBERT, Dublin.

FISHES.

The Allis Shad (*Clupea alosa*, L.) in the Erne.—Mr. Allingham of Ballyshannon, Co. Donegal, has forwarded me a specimen of the Allis Shad from the River Erne, with the remark that the fishermen called it a "French Herring." This species of Shad is extremely like the "Twaite Shad," which occurs chiefly in the South of Ireland—indeed, the only reliable method of distinguishing the two species is by means of the "gill rakers." These are processes projecting from the outer gill-arch, and are well seen by lifting up the gill-cover at the side of the head. In the Allis Shad, there are from 60 to 80 of these processes, whilst the other has only from 20 to 30. Both the species are in the habit of ascending rivers from the sea, in order to spawn. Although Dr. Day records their having both been obtained in Ireland, yet Thompson, in his *Natural History of Ireland*, appears to entertain some doubt whether the Allis Shad should be admitted as Irish.—R. F. SCHARFF, Dublin.

BIRDS.

American Golden Plover (*Charadrius dominicus*) in Ireland.—On the 12th of September, whilst examining a lot of Golden Plover which had been forwarded from Belmullet, Co. Mayo, to our Dublin market, I picked out a bird of this species, an adult, still retaining a good part of the black of the summer plumage on the breast. It differs greatly from our European bird (*Charadrius plumialis*) in many ways, being much longer in the tarsus, the axillary feathers being smoky black (in our bird pure white), and a broad band of white over the eye. I think I am correct in saying one or two specimens have occurred in Heligoland, and one in Scotland, but the species has hitherto been undetected in Ireland.—EDWARD WILLIAMS, Dublin. 50

Spotted Redshank in Dublin Bay.—The Spotted Redshank (*Totanus fuscus*) is usually considered a very rare Irish bird, but from the number of times I have met the species, I should be inclined to say it is far commoner than is supposed. In the month of September, 1888, two birds passed me with a peculiar note, on the marsh at the North Bull, which I could not identify at the time, but having heard the note of the Spotted Redshank a good many times since, I have no doubt were birds of this species. In September, 1890, one was shot out of a flock of Common Redshanks at the Bull. On the 23rd September, 1891, I obtained a beautiful specimen on the marshy point in Baldoyle Estuary. October 3, 1892, I saw one at the same point, but owing to its excessive wildness, I failed to get a shot at the bird. This year, while out shooting with my friend, Mr. C. Patten, on 7th September, one passed us at about a hundred yards, just opposite Dollymount, on the North Bull. The note of the bird is a peculiar twitter, quite unlike the bold whistle of the common species, but the most distinguishing mark is the absence of the broad white bands on the wings so conspicuous in our ordinary Redshank.—EDWARD WILLIAMS, Dublin.

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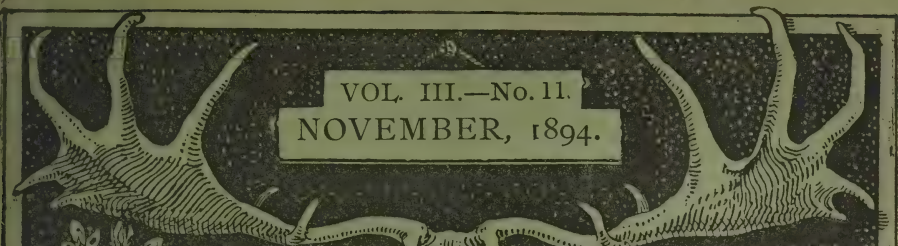
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The Irish Naturalist.

Vol. III.

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No. II.

THE BELFAST FIELD CLUB IN DONEGAL.

BY MISS S. M. THOMPSON.

IN splendid weather, and just in the mood for an enjoyable tour, about forty members of the Belfast Naturalists' Field Club started for North Donegal on the 11th of last July. The Club rather prides itself upon the favour shown to it by the "Clerk of the Weather," and as even the warmest admirer of our climate could scarcely assert that the summer of 1894 was a fine season, the members had much reason to congratulate themselves upon that fortunate circumstance. True, we had one heavy shower that day during the journey from Derry to Fahan, but the train unaccountably stopped until it was over, and a member gratefully suggested that the directors wished to spare us a wetting whilst crossing Lough Swilly. Very beautiful was this passage in the special steamer chartered for the occasion, across the "Lake of Shadows," richly deserving its name as it lay basking in the varying tints and fitting lights of a most perfect summer day.

Leaving Fahan on the right hand, Buncrana with its charming golf-links soon became visible, with the grand Innishowen Mountains slumbering in the sunshine; whilst the western coast, with the strange serrated ridge of the Devil's Backbone culminating in the fine mass of Knockalla, completed a picture not soon to be forgotten. Steaming northwards, leaving Dunree Fort on the right, we presently reached the merciless quartzite rocks at the entrance of Ballymastocker Bay upon which H.M.S. *Saldanha* struck during a storm in 1811, and driving on into the bay perished with all on board. But this day Dame Nature was propitious, and the beautiful sandy shore was smiling a welcome to the hungry travellers as they reached the little Port Salon pier at two o'clock, and streamed up the lawn to the hospitable hotel.

Then came dinner, and a long delightful afternoon, as the party leisurely proceeded to visit the beauties of Fanad under the kindly guidance of the Rector, the Rev. A. H. Delap. Of course the famous Seven Arches were our first object, and very marvellous and interesting are these great sea-caves, carved by the restless waves, whose erosive power has been assisted by the natural jointing and stratification of the rock, and which are still tunnelling through long dark rifts landwards, to form yet more arches for the inspection of future Field Clubs. These Donegal quartzites were very interesting to the party, who had recently visited Scrabo, whose ripple-marked and current-bedded sandstones imitate these much older rocks, with the addition of the richly varied colouring that gives such a charm to the County Down Trias. Here too, as at Scrabo, are great intrusive dykes running through the sedimentary rocks, but in this case composed of diorite.

But a still finer sight awaited us further on, when Doagh Beg met our delighted eyes—a grand arch standing in proud isolation, seeming to defy the elements that had carved it to injure or deface their work. How indescribably subtle is the difference betwixt arch and arch, between curve and curve, that makes the one or other perfectly satisfactory to the artistic instinct, is familiar to everyone who visits a cathedral, or revels in the beauty of mountain forms! But we sat on the sunny turf, and gazed with supreme admiration at our arch, and were contented. And the landscape beyond the lough was a worthy background for this noble specimen of Nature's architecture. Innishowen peninsula lay stretched in beauty before us—the main range with Slieve Snaght and other mountains in abundant confusion, then a low sandy neck, and out to the north crouched Dunaff Head facing the Atlantic like a mighty guardian lion. Some of our party clambered round below upon the rocks, and others gathered shells, whilst Mr. Delap guided the remainder along the cliffs to obtain a view of the Binn, a vertical precipice of rock towering above the waves, said to be the finest piece of cliff scenery on Lough Swilly. Thence we turned homewards, past the boggy hollows bright with Asphodel, Bog Cotton, and the pretty little pink Pimpernel, the road winding amongst level-topped hills capped with diorite, and the characteristically different quartzite hills, until we reached St. Columba's Well.

We tasted the water, added a stone to the cairn, and noted the votive rags tied upon the bushes round the simple little fountain, sympathizing with the grateful affection that placed them on the spot hallowed by traditional memories of a great teacher.

It was nine o'clock before the hotel was reached, and we gathered in for tea in the long pleasant dining-room, decorated with a wonderful profusion of white "*Bride*" *Gladioli*. After tea some went off to inspect the gloomy recesses of a great sea cavern by candle-light, but most of us thought we had seen enough for one day. Some were early astir next morning to enjoy a plunge in the lough, and see the cavern by daylight, whilst a few started at six to drive along the splendid strand past the golf-links (where the exquisite view must surely interfere with due attention to that royal game), to visit a curious ridge of hardened sand in the sandhills, and inspect the beds of conglomerate that run along the foot of Knockalla Mountain. Their precise age gave rise to much discussion, but they are now declared in the Geological Survey Memoir to be Old Red, brought down by a fault into their present position. Close by are pale blue beds of highly crystalline limestone dipping at a high angle, part of a range running right across Fanad and re-appearing in the Innishowen peninsula. Returning to the Hotel we passed Col. Barton's residence, where two cannon from the ill-fated *Saldanha* do duty as gate pillars at the entrance.

After breakfast the baggage was despatched on cars to wind round the head of Mulroy Bay to Rowross Ferry, and the majority, bidding farewell to Miss Barton, started to walk to Moross Ferry on Mulroy, and cross the peninsula known as "Between the waters" to the north-west arm of the bay, where Rowross is situated. A small minority drove to Fanad Glebe, whence Mr. and Mrs. Delap conducted them to the boathouse, and they were soon gliding down the north water to see the strata of limestone on the eastern shore of "Between the waters," which are much contorted into synclinal and anticlinal curves of evenly bedded rock, sometimes only an inch or two thick. Mulroy Bay is as remarkable for its depth of 162 feet as its perplexing windings, and here where it is only half a mile in width two tiny islands of igneous rock rise out of water 150 feet deep. On the mainland a larger mass

risers to a height of 500 feet, crowned with the remains of an old fortification, from which is gained its name of Cashelmore, and close by is the cottage where Miss Patterson was born, who subsequently married Jerome Bonaparte, but was divorced by Napoleon's orders, living on to the advanced age of 93.

The scenery about Mulroy recalls the Scottish Highlands, with its tumbled masses of grey rocks, Heather, Mountain Ash, and every kind of brushwood, and Mr. Delap drew our attention to the Wood Vetch clambering and blossoming above the bushes. As we approached Moross Castle we saw the rest of the party waiting in the ferry-boat, having already examined the extraordinarily contorted schistose rocks upon which Moross Castle is built, which are puckered and frilled in leafy layers, most tempting to cameras and the hammers of amateur geologists!

Mulroy Bay is not only perplexing from its windings, also remarkable for its tidal arrangements; even twenty-two miles from its mouth there is a rise of eight feet, whilst there is an hour's difference in high tide between the outer and inner waters. At a narrow part called the "Hasseins" the tide pouring over a kind of sill of schistose quartzite is only seven-and-a-half feet deep, and within a boat's length outside is water sixty-two feet in depth! No wonder a special steamer had to be built to navigate such a passage as this.

Time pressed, and we were remorselessly hurried across the ferry, and traversing the peninsula "Between the waters" soon reached Rowross Ferry, crossed to Lord Leitrim's pier, and drove through Carrigart and across the sandy bay to Rossgull peninsula, lying between Mulroy and Sheephaven, where Rosapenna hotel, a picturesque Norwegian wooden structure, nestling among sandhills replete with kitchen-middens and putting-greens, was our destination.

After dinner most of the party were kindly conducted by the Rev. Father Gallagher to the ruins of Mevagh and its weatherbeaten stone cross, returning over the summit of Ganiamore (682 feet). But some of us wished to visit Sheephaven, and whilst waiting for a boat watched with much interest the embarkation of Messrs. Welch and Wilson with their cameras in a curach to photograph the contorted quartzite strata of Muslac, which Mr. Welch has kindly allowed to be

reproduced to illustrate this paper (Plate 5). A delicious breeze sent our substantial fishing boat spinning across Sheephaven and back to Downing's Pier, whence we skirted along the hills and ascended Ganiamore, where we revelled in the astonishing panorama spread before us. At last Mulroy's windings could be understood, and we gazed with great interest at our route of the forenoon and the morrow. Southward lay Lough Salt Mountain and the other Donegal giants, with Muckish leading our gaze westward to the noble cliffs of Horn Head, highest and grandest of the northern headlands, Tory Island, upon which the gunboat *Wasp* was lost in 1884, lying like a dream upon the horizon.

A rough scramble brought us down to Mevagh Church with its rude impressive cross; returning homewards we visited the inscribed stones in passing. Ice-worn and time-worn, they rise from the turf, decorated with concentric circles and patterns like the New Grange carvings, mute witnesses of a bygone race and their art.

Next morning we started for Belfast, and Donegal wept over our departure all the way to Derry. We drove from Rosapenna, across the sandhills (where some of our party had been ransacking kitchen-middens before breakfast); past the site of Rosapenna House, formerly the residence of Lord Boyne, now covered with blown sand, only the tops of the garden walls remaining visible, eighteen houses in the vicinity having suffered a similar fate. From Carrigart we turned southward, driving along the western shores of Mulroy, sometimes wild and bare, sometimes between woods carpeted with *Lastrea æmula* and other ferns—passing the spot where Lord Leitrim was murdered in 1878, over Bunlin Bridge, where the scenery is like a Canadian lake, and so into picturesque Milford, where a short halt was made for lunch at Mrs. Baxter's hospitable little hotel. Then across the rising ground, past bogs and tarns and ice-scratched rocks, to Lough Swilly, and along its western shore to Rathmullan, where another pause gave time to inspect the ruins of the castle and abbey. But the little steamer could not wait, and in dripping rain we crossed the lough to Fahan, and soon reached Derry once more. By the courtesy of Dean Smyly the cathedral was specially opened for the Club, and after visiting the historic walls the party assembled at the Northern Counties

Station for tea. Some had been left behind at Rathmullan, to revisit Port Salon neighbourhood, whilst others remained over the Sunday in Derry, but the bulk of the members returned home in the exquisite evening light, cordially agreeing that it had been a most charming and successful trip amongst enchanting scenery.

NOTES ON THE MARINE INVERTEBRATES OF RUSH, COUNTY DUBLIN.

BY J. E. DUERDEN, A.R.C.Sc. (Lond.)

THE following notes are based principally upon the material gathered on the excursion of the Dublin Naturalists' Field Club to Rush and Skerries on the 8th September, 1894. The excursion was organized for the purpose of studying the marine fauna and flora of this portion of the Dublin coast. So far, few collections have been recorded from the district. Owing to the fact that it was low water about noon, and that the party, following out the programme arranged, could not reach Rush before three o'clock, I found it desirable to go by an earlier train, and was thus collecting on the shore before the tide turned. I devoted the time to the rock-pools a little north of the harbour at Rush. Here the Upper Carboniferous Limestone crops out at a considerable angle, the direction of the strike being almost at right angles to the shore. Many rock-pools occur here. These are occupied largely by algæ, amongst which, and along the sides of the rocks, I found a moderately rich fauna. I again visited the place during the next spring tides and added a few specimens to those collected on the excursion. On this occasion I confined my attention to the rocks a little north of the martello tower.

The sides and stones in some of the rock-pools were coated with the red calcareous alga *Melobesia* and the pink *Lithothamnion polymorphum*. Many of the zoophytes, especially *Obelia* and *Flustra*, were of a bright red colour, due, as I was informed by Prof. Johnston, to the presence of *Rhodochorton membranaceum*, a red alga only recently added by him to the Irish flora. The calcareous spicules of one of the sponges examined (*Leucandra nivea*, Grant), were already attacked by

one of the minute forms of algæ which have lately been shown to perforate shells and other calcareous skeletons, and restore the lime again to a soluble form.

Amongst the PROTOZOA specimens of the arenaceous rhizopod *Haliphysema Tumanowitzii*, Bowk., were abundant, growing upon *Crisia* and *Scrupocellaria*. Professor Haddon in his report on the Fauna of Dublin Bay¹, has recorded this species from Dalkey Island, and refers to its chequered history, it having first been placed amongst the sponges, and again regarded by Hæckel as the type of a distinct class. I have previously found it abundant from Howth, growing upon *Scrupocellaria*. Some of the zoophytes were perceptibly coloured by the minute green horny sheaths of the infusorian *Folliculina ampulla*, Müll.

PORIFERA.—The sponges were abundant, coating the surfaces of the rocks, stones, and weeds. I obtained the following:—*Sycon compressum*, Auct., *Grantia coronatum*, E. & S., *Leucandra nivea*, Grant, *Halisarca Dujardinii*, Johnst., *Hymeniacidon sanguineum*, Grant, *Halichondria panicea*, Pallas, and *Dendoryx incrustans*, Esper. Of these *Leucandra nivea* is new to Co. Dublin, and, so far as I can learn, to Ireland. Small patches, encrusting the rocks, occurred at low water.

In the nomenclature of the sponges I have followed Dr. Hanitsch's Revision (*Trans. L'pool Biol. Soc.*, vol. viii., 1894, pp. 173 to 206). For the opportunity of seeing this I am indebted to Prof. Haddon, who has kindly helped me on several other matters connected with the paper.

HYDROZOA.—I obtained upwards of twenty species of hydroids, of which the following only call for notice—*Atractylis arenosa*, Alder, growing upon *Dendoryx incrustans*. This is a very minute and rare zoophyte. I have only obtained it once previously from Ireland². Colonies of *Coryne vaginata*, Hincks, were abundant amongst the sea-weeds. *Campanulina turrita*, Hincks, found growing upon *Campanularia verticillata*, Linn. First found by Prof. Wyville Thompson in Belfast Lough, and described by Mr. Hincks, I have since obtained the species from different points of the Irish coast, but so far as I am aware, it has never been collected beyond Irish waters.

1. *Proc. Roy. Irish Acad.* (2), vol. iv., No. 5 (Science), p. 523.

2. Rep. on the Hydroids of the S.W. of Ireland. *Proc. Roy. Irish Acad.* (3), Vol. iii., No. 1, p. 140.

Especially abundant was the delicate *Plumularia echinulata*, Lamk., growing on quite a variety of objects.

ACTINOZOA.—On one of the ledges of rock a considerable number of specimens of *Metridium* (*Actinoloba*) *dianthus*, Ellis, were found, of the brown and white varieties. *Cylista undata*, Müll., was represented by an immature specimen. The common *Actinia equina*, Linn. was abundant everywhere. One of them has since increased my stock of anemones by six young ones. Several specimens of *Anemonia sulcata*, Penn., both the variety with iridescent green, rosy tipped tentacles, and the one with plain grey tentacles were obtained. *Bunodes gemmaceus*, E. & S., was represented by three or four young ones, while large numbers of *Tealia crassicornis*, Müll., were seen.

ECHINODERMATA.—Only two species of Ophiuroids were obtained—*Ophiothrix fragilis*, Müll., and *Amphiura elegans*, Leach.

VERMES.—Under the stones, *Lineus marinus*, Mont. was found, while *Phyllodoce viridis*, Linn., was common at low water, creeping amongst the crevices of the rocks. The arenaceous tubes of *Terebella*, and the smooth tubes of mud formed by *Sabella* were obtained, but unfortunately not the inhabitants themselves.

Of the POLYZOA I identified about thirty species. Of these the following are recorded in the Brit. Assoc. List as being rare in Co. Dublin :—*Eucratea chelata*, Linn., *Bicellaria ciliata*, Linn., *Cribrilina punctata*, Hass., *Valkeria uva*, Linn., and *Pedicellina cernua*, Pall. *Schizoporella unicornis*, Johnst., is new to Co. Dublin. It has only been previously recorded for Ireland from Antrim. This is the first time *Alcyonidium mytili*, Daly, has been mentioned for Ireland, though considering its abundance in Dublin Bay and elsewhere around the Irish coasts, it has probably been passed over for some of the other species of the genus. It is very probable that the *Sarcochitum polyoum*, of Hassall¹, obtained from Dublin Bay growing on *Fucus* shells and stones, belongs to this species.

MOLLUSCA.—Of the Nudibranchs, I obtained several specimens of the beautiful *Eolis coronata*, Forbes, upon the lower part of the stems of *Halidrys siliquosa*. Also a single example of *Eolis exigua*, Ald. and Hanc. This minute species has previously been recorded for Co. Dublin by Prof. Haddon, from Kingstown Harbour.

¹ *Ann. Nat. Hist.*, vol. vii., p. 484.

CRUSTACEA.—Amongst the Amphipods, *Caprella linearis*, Linn., was in considerable abundance, looping about amongst the weeds and zoophytes. In similar places the Isopod *Idotea tricuspidata*, Desm., occurred abundantly. Two smaller forms, *Dynamene rubra*, Leach., and *D. viridis*, Leach., were plentiful on the *Fuci*. They are about one-fifth of an inch in length, and are often found together. They are both new to the fauna of Co. Dublin. Mr. Thompson has taken the former at Bangor, and the latter at Lahinch in Co. Clare. The edible crab, *Cancer pagurus*, Auctt., and the common shore crab, *Carcinus mœnas*, Leach., were collected. The smooth rocky floors of some of the pools formed a convenient battleground for small hermit crabs, *Eupagurus bernhardus*, Fabr. Overturning the stones rewarded one as usual with numbers of *Porcellana platycheles*, Linn., and *P. longicornis*, M. Edw.

The PYCNOGONS collected were handed over for determination to Mr. G. H. Carpenter, and he has kindly returned me the following list:—*Nymphon rubrum*, Hodge, *Pallene brevirostris*, Johnst., *Phoxichilidium femoratum*, Rathke, *Anoplodactylus petiolatus*, Kr. This species is new to the east coast of Ireland. *Phoxichilus lævis*, Grube, *Ammonothea echinata*, Hodge, *Pycnogonum littorale*, Str.

IRISH MOTHS.

(Concluded from page 220.)

ARCTIIDÆ.

Nemeophila russula, L.—West of Ireland; local, but often abundant:—Cos. Antrim, Donegal, Sligo, Galway, Cork, and Kerry.

N. plantaginis, L.—Generally distributed on heaths and bogs:—Cos. Derry, Antrim, Tyrone, Fermanagh, Sligo, Galway, Westmeath, King's, and Kerry.

Arctia cala, L.—Common everywhere.

Spilosoma fuliginosa, L.—Widespread; locally common.

S. mendica, Cl., and var. **rustica**, Hb.—Rare:—Cos. Antrim, Armagh, Dublin, Wicklow, Waterford, Limerick, Galway, and Cork.

S. lubricipeda, Esp. }
S. menthastris, Esp. } Common everywhere.

LITHOSIIDÆ.

Delopela pulchella, L.—Has occurred singly at Ardmore, Co. Waterford, and Bandon, Co. Cork.

Euchella Jacobææ, L.—Common everywhere.

Nudaria senex, Hüb.—Once at Fenniskillen.

N. mundana, L.—Generally distributed, and common.

Setina irrorella, Cl.—Cos. Mayo, Galway, and Clare.

Calligenia minlata, Forst.—Co. Galway.

Lithosia sororcula, Hufn.—Killarney.

L. lurideola, Zinck.—Galway.

L. complana, L.—Widely distributed along the coast :—Cos. Derry, Down, Dublin, Wexford, Waterford, and Cork.

L. caniola, Hb.—Very local, and it is feared extinct; formerly at Howth, Co. Dublin; Tramore, Co. Waterford.

Gnophria quadra, L.—Very rare :—specimens at Ashford, Co. Wicklow; New Ross, Co. Wexford; Lismore, Co. Waterford; and Limerick.

G. rubricollis, L.—Widespread in the south and west :—Cos. Dublin, Waterford, Galway, Cork, and Kerry.

NYCTEOLIDÆ.

Sarrothripus undulanus, Hb.—Local :—Cos. Tyrone, Westmeath, Dublin, Wicklow, Galway, Limerick, and Kerry.

Hylophila prasinana, L.—Widespread :—Various localities from Derry to Kerry.

NOLIDÆ.

Nola confusalis, H.-S.—Generally distributed.

DREPANULIDÆ.

Drepana lacertinaria, L.—Generally distributed; sometimes common.

D. falcataria, L.—Rare :—Cos. Tyrone, Mayo, Galway, and Kerry.

Gilix glaucata, Scop.—Widespread, but scarce and local :—Cos. Tyrone, Armagh, Dublin, Wicklow, Westmeath, King's, and Galway.

COCHLIOPODIDÆ.

Heterogenea limacodes, Hufn.—Clonbrock, Co. Galway.

ZYGÆNIDÆ.

Ino statice, L.—Generally distributed, and locally common.

Zygæna pilosellæ, Esp., var. **nubigena**, Led.—Cos. Galway and Clare.

Z. trifolii, Esp.—Rare :—Cos. Donegal, Fermanagh, Monaghan, Armagh, and Galway.

Z. ioniceræ, Esp.—Rare :—Cos. Armagh, Galway, and Kerry.

Z. filipendulæ, L.—Generally distributed and common.

SYNTOMIDÆ.

Nacilla ancilla, L.—Clonbrock, Co. Galway, two specimens only.

SESIIDÆ.

Trochillum apiformis, Cl.—Rare and local :—Cos. Dublin, Waterford, and Cork.

T. crabroniformis, Lewin—Widespread, often common :—Cos. Down, Derry, Monaghan, Westmeath, Dublin, Kildare, Clare, and Cork.

[**Sesia scolliformis**, Bork.—Killarney—supposed larva-borings only].

S. tipulliformis, Cl.—Probably widespread :—Cos. Derry and Dublin.

S. myopiformis, Bork.—Rare :—Dublin and Cork.

S. culiciformis, L.—Rare :—Killarney, Ballinasloe, and Derry.

S. musciformis, View.—Rare :—Howth, and Saltee Islands, Co. Wexford.

COSSIDÆ.

Cossus ligniperda, Fb.—Local :—Co. Dublin, Wicklow, Kildare, Carlow, King's, Waterford, and Galway.

Zeuzera pyrina, L.

Macrogaster castaneæ, Hb. } Clonbrock, Co. Galway.

HEPIALIDÆ.

Hepialus humuli, L.—Common everywhere.

H. sylvanus, L.—Clonbrock, Co. Galway ; two specimens only.

H. velleda, Hb., and var. **gallicus**, Led.—Generally distributed ; often common.

H. lupulinus, L.—Co. Galway. Armagh (Rev. W. F. Johnson). Dingle (J. N. Halbert).

H. hectus, L.—Widespread, but local ;—Cos. Antrim, Fermanagh, Tyrone, Westmeath, Galway, Wicklow, Cork, and Kerry.

In dealing with the butterflies, we had Mr. Barrett's completed volume on the group before us as well as Mr. Kane's list. Naturally the progress of the former gentleman's work is considerably slower than that of the latter's. We hope when Mr. Barrett's second volume is completed, to notice it, and also to review Mr. Kane's lists of *Noctuidæ*, *Geometridæ*, and remaining families as they appear. Mr. Dillon's records for the Noctuids and Geometers are already before us, and we find that in these families he has added *Moma orion*, *Leucania extranea*, *Dipterygia scabriuscula*, *Cloantha polyodon*, *Luperina cespitis*, *Pachnobia hyperborea*, *Calocampa solidaginis*, *Xylina semibrunnea*, *Pericallia syringaria*, *Eugonia fuscantaria*, *Zonosoma orbicularia*, *Cheimatobia boreata*, *Eupithecia fraxinata*, *E. indigata*, and *Thera juniperata* to the Irish list.

THE RECENT IRISH GLACIERS.

BY G. H. KINAHAN, M.R.I.A.

THE title of this communication may not possibly be strictly correct; however, the ice or frozen snow accumulations, to be mentioned hereafter, have already been called by the Rev. M. H. Close in his publications "*corrie glaciers*"; it therefore may be allowable for me to similarly classify them; also similar snow accumulations in British Columbia along the Canadian Pacific Railway are called glaciers. The latter however are permanent, lasting from year to year, while those in Ireland disappear in the summer.

When examining the west Cork hills some forty years ago, there were in the different cooms and valleys peculiar accumulations evidently in some way due to ice or its adjuncts. It is probable that, at that time, in my ignorance, a wrong origin was suggested, as it was supposed that they belonged to the Glacial period; while knowledge since gained would seem to prove that these terminal moraines may possibly be accumulating at the present day, similar to those that can be ocularly proved in the Cos. Galway, Mayo, and Wicklow; possibly also in other hill districts; but the above counties are specially mentioned, as this phenomenon has been studied in them.

Chance led to the study of these glaciers in Galway and Mayo. When stationed one winter in Connemara we were snowed up for nearly three weeks, and as our supply came from Galway, all fresh meat had to be procured by the gun in the hills.

Previously to this there had been observed peculiar stacks of blocks, such as that in Glen Inagh, that rose in the centre of the valley 30 or 40 feet high; also in places on a slope below a cliff, part of the pasture would be more or less thickly sprinkled over with stones. If you asked what brought them there you were told they were "*cloghsnatty*" or "*snow stones*," but at the time the reason for the name I could not understand, not knowing Irish, and my man not being able to properly explain in English.

However, shooting in the Connemara Hills, during the big snow, explained all. In the cooms and under the high

cliffs great snow-drifts accumulated, from fifty to hundreds of feet in depth, and often from 200 to 500 or more yards wide. These drifts had certain defined limits, due to shoulders on the hill slopes that acted as groins, behind which the snow was impounded. After the snow-fall ceased, the surface of the drifts melted and froze; so that after all the snow elsewhere had disappeared, these drifts still remained, often for months. As is always the case after a severe frost, blocks and other detritus are displaced by falls when the thaw comes on; and if the fall is from a cliff over one of those drifts, the blocks and other stuff slide over it and form round its edge a terminal moraine. After a severe winter this phenomenon can be studied in the month of March, in the Co. Wicklow, at the North and South Prisons, Slieve-na-calliagh, and in the coom west of Kelly's Lough; as in these places, great and long enduring drifts form during any heavy snow-fall. These snow-drifts nearly invariably disappear in as sudden a manner as they were formed; they may last for weeks or months; but when the ground gets to a certain temperature all go at once. About the year 1870 there were great snow lakes in the valleys of the tributaries of the Ovoca; and the snow barriers all burst nearly at the one time—at mid-day early in June, flooding the whole valley and carrying away the bridges.

Those who wish to study this phenomenon should visit the hill districts when in deep snow, and thereby learn the localities of the deep and lasting drift, and afterwards visit them in the subsequent thaw, and see the stones sliding over them as they break loose.

Under a cliff on Lissoughter, Co. Galway, there was such a drift, that I was going to cross in the thaw when out shooting, but my man advised me not to do so, for although the snow was quite safe, blocks might come down; he, at the same time, pointing to a mass that he said was loose; this broke away and slid over the glacier before we left the spot. A stack of blocks in Glen Inagh over which I was puzzled led me to visit this valley at this time. Here about 200 yards from the cliff there was an isolated stack; on visiting the place in snow I found, under the nearly perpendicular cliff margining the valley to south and west, there was one of those frozen snow-drifts, while near the centre of it was a valley between the peaks called Benbawn and Bencorrbeg. Down this valley, in

the thaw, blocks shot straight over the glacier to one spot, there accumulating the stack that had so often puzzled me when shooting in the glen. In other places in these hills, those of Mayo, Donegal, &c., I have seen similar stacks, but in no places did I verify their formation but in this locality.

In the Co. Donegal, between the highlands of Kilmacrenan and Boylagh baronies, and the highlands of Barnesmore, that lies between the valleys of the Swilly and Finn, there is a comparatively low country, in which in places I saw stacks of small dimensions. Their origin interested me, and during my residence of some five or six years at Letterkenny and Ramelton I found that if there was a fall of snow in the county it was greater in this area than elsewhere, even on the hills, except Knocksnatty, east of Glenties. You could scarcely get from Letterkenny to Stranorlar on account of the snow-drifts, while you could drive anywhere through the Northern Highlands.

Snow-drifts in the Donegal Highlands while I was there were not as marked features of the hills as those in the Co. Wicklow, but there was one large drift to the north-east of Errigal, over which, during the thaw, the quartzite detritus slid, and has formed at its margin a massive esker-like high accumulation of shingle. In this county, between Falcarragh and Gweedore, there is, in the valley through which the road runs, a peculiar ridge of large blocks, which I suspect must be due to a snow-drift under the cliff to the westward; this, however, I was not able to verify while I was in this county.

On the flat between this valley and the sea south of the Bloody Foreland, there is an irregular curved line of blocks, or rather there is a tract without blocks, and a tract with blocks; the blocks becoming more frequent as you approach the curved marginal line. The reason for this was familiar to me—the slope in some years was covered with frozen snow, over which stones from the high ground slide, when the thaw commenced. This I had previously studied in the Cos. Wicklow and Wexford, especially at Ballinsillog, on the slope north-east of Croaghan Kinshallagh, near the boundary of the two counties. When this slope was visited there was scarcely any snow on it, but what had been there had melted and frozen and was a sheet as slippery as glass. Over this stones were sliding, from the size of eggs to over half a hundred-weight,

the escarpment above not breaking up in large pieces. At the beginning of the thaw the detritus ran down all the way to the wall between the pasture and the tillage, but as the ground melted they stopped on the pasture, so that, when the frost was gone, they had to be carted off. There was a tradition in the place that in old times no rent was to be paid for the townland if there were snow after the first of March.

In my description in the Memoirs of the Geological Survey of the drift of the mountainous districts examined by me, various ridges and stacks of blocks will be found mentioned, the origin of which I could not then satisfactorily state or even suggest. This is specially the case in the low, but hilly granite ground, between Galway Bay and the valley from Clifden to Oughterard.

Experience, however, teaches, and after seeing what took place in the Co. Wicklow during a winter of heavy snow, the origin of such ridges and stacks dawned on me. Subsequently I saw in the cuttings of the Canadian Pacific as it crossed the Rockies, in the Kicking Horse Pass, well-exposed sections of these snow-drifts and *névé* marginal remains. What is to be seen there is most instructive, as it fully explains our Irish recent glaciers. At the time of my visit to the "Foot Hills" of the Rockies the snow-drifts were gone for the season, but the terminal moraines were there, being more or less similar to the Irish ones; higher up in the Rockies the drifts and their moraines were intact, so that the railway cuttings exposed good sections. My visit to Canada was so short that my conclusions can scarcely be of much value. Yet it was long enough to explain points in the Irish drift phenomena previously inexplicable.

While stationed in the Co. Cork I had a rare opportunity, during an exceptionally hard winter, of studying the recent ice and glacier work, but unfortunately I did not avail myself of it, but ran out of the county and did not return till March. It was not till I went to Connaught that I saw what I ought to have previously seen; and subsequently, on all occasions, when in the vicinity of hills, they were visited in the snow and thaw. Anyone interested in the phenomena could not do better than spend a week or fortnight at Fogarthey's Hotel, Drumgoff, Glenmalur, as he would be within an easy tramp of the summit of Slieve-na-gollian, and from it study the peculiarities of snow-drifts. He should go up the valley to

the pass, then south along the ridge to the summit of Slieve-na-Cullagh, and return eastward by Kelly's Lough. An inquirer, however, would have to pay at least two visits; one during the snow-fall and at least one after the general snow had gone and only the drifts remained. Glendalough of St. Kevin's does not appear to be a good centre, as I went there in heavy snow and frost when all the lakes were frozen over, but was disappointed in getting information as to the results of the drifts.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a pair of Toads from Rev. S. A. Pelly, a Cockatoo from Rev. J. E. Moffat, and a Snake from R. B. Hall, Esq. A Red Deer fawn has been born in the Gardens, while two Ostriches, two Black-backed Jackals, two Hyæna-Dogs, a large Baboon, three Monkeys, a Lemur, and two Bull-frogs have been purchased.

BELFAST NATURALISTS' FIELD CLUB.

AUGUST 25th.—Excursion to Dundrum, attended by a party of over fifty. Proceeding by the 9.15 train, the first point of interest was the fine Anglo-Norman castle, which rises above the town; its principal features were described by the President (Mr. F. W. Lockwood). The ruined church of Maghera, and the cromlech and pillar-stone at Slidderyford, were subsequently examined. The party then proceeded to the sandhills, where the fine raised beach and overlying traces of pre-historic human habitation claimed attention. On the dunes the botanists gathered the Meadow Rue (*Thalictrum minus* v. *dunense*), Hound's-tongue (*Cynoglossum officinale*), Sea Spurge (*Euphorbia paralias*), and Sea Holly (*Eryngium maritimum*). The members partook of tea at the Downshire Arms hotel, and returned to Belfast by the evening train.

DUBLIN NATURALISTS' FIELD CLUB.

SEPTEMBER 8th.—Excursion to Rush and Skerries. A party of forty-five members and friends took the 1.30 train from Amiens-street to Rush. On the walk from the station to the shore some plants were found, including Viper's bugloss (*Echium vulgare*), Flixweed (*Sisymbrium sophia*), Scale Fern (*Ceterach officinarum*), Wild Mignonette (*Roseda lutea*), Tansy (*Tanacetum vulgare*), Bugloss (*Lycopsis arvensis*), while some members who examined a stretch of sand-dunes lying a little to the south, got in addition a number of remarkably large specimens of the pretty Hare's-foot Trefoil (*Trifolium arvense*), two feet in height, and a few plants of the Black Mustard (*Sinapis nigra*) and of Sea Purslane (*Atriplex portulacoides*). Passing through the village of Rush, the route lay northward along the shore, where the highly-inclined and vertical beds of Carboniferous limestone, projecting into the sea in long ridges, excited the interest of the geologists of the party. On the low cliffs and steep banks grew abundance of Samphire (*Crithmum maritimum*) and Sea Lavender (*Statice occidentalis*). Here also the Field Woundwort (*Stachys arvensis*), a plant very rare in County Dublin, was obtained. From the Martello Tower a beautiful view was obtained, embracing the mountains of Dublin, Wicklow, Down, Louth, and Armagh, and the lower grounds

of Meath; and a glorious prospect of blue sea, on which thousands of sea-birds were busily engaged in fishing. The rock-pools were explored by Mr. J. E. Duerden, and his results appear in a paper in our present issue. Mr. H. K. G. Cuthbert collected beetles, and obtained the following species:—*Dromius meridionalis*, *Ocyptus morio*, *Philonthus laminatus*, *Stenus guttula*, *Astilbus canaliculatus*, *Lema lichenis*, *Halysia xviii.-guttata*, *Salpingus castaneus*, *Ceuthorrhynchus litura*, and *C. pleurostigma*. Among other insects obtained were the caddis-fly, *Linnophilus vittatus*, and the grasshoppers, *Stenobothrus viridulus* and *S. bicolor*. Mr. Carpenter secured the harvestman *Phalangium saxatile*, for the first time in Ireland. Soon the quaint little village of Lough Shinny was passed, and a pleasant walk through fields, where harvesting operations were in full swing, brought the naturalists to Skerries, where the Misses Gardiner had an ample repast spread in a meadow facing the sea. After tea the road was taken to the station. Near the old windmill both the Black and White Mustard (*Sinapis nigra* and *S. alba*) were observed, and abundance of Black Horehound (*Ballota nigra*), and fading twilight did not deter the botanists from detecting in the gravel pit near the station several uncommon species, such as the Long Prickly-headed Poppy (*P. Argemone*), the Blue Flea-bane (*Erigeron acris*), and the Red Hemp-nettle (*Galeopsis Ladanum*). The party returned to town by the 6.40 train, well pleased with their day's outing.

CORK NATURALISTS' FIELD CLUB.

AUGUST 29th.—One of the most successful expeditions of the above Club took place on this date, when a small party paid a visit to the interesting limestone caverns at the Ovens. The party, which included Professor Hartog, D.Sc.; W. H. Shaw, B.E.; T. Farrington, M.A.; D. Franklin, J.P.; H. Lund; J. H. Bennett; W. Hill; R. Blair; C. Franklin; J. Noonan, and several ladies, started by the 2 p.m. train for Kilumney Station, and after a pleasant walk reached the entrance of the caves about 3 p.m. After about three hours stay underground, during which several passages were explored, and the foundations for a plan of the caves laid, the party adjourned to the Station house, where the forethought of the ladies had provided a comfortable tea. Thence the company dispersed to travel home by road or railway.

NOTES.

BOTANY.

PHANEROGAMS.

Plants of Courtown and Arklow.—Courtown Harbour, Co. Wexford, did not appear to be so productive in the way of plants as it is with regard to insects. During a few days spent there in August, the following were noted. On the narrow belt of sandhills that fringes the coast for some miles north and south grew *Thalictrum maritimum*, *Eryngium*, *Gentiana campestris*, *Convolvulus Soldanella*, *Cynoglossum*, *Euphorbia paralias*, and *E. portlandica*, the last named being recorded from this locality in "Cybele Hibernica." *Lithospermum officinale*, and *Equisetum hyemale* grew in bushy places by the shore a mile north of Courtown. In a pool among the dunes where the river which now flows into the harbour formerly entered the sea grow *Potamogeton pectinatus* and *Ruppia maritima*—the typical form, with long spiral flower-stems and inflated sheaths. *Crithmum* is abundant on all rocky places by the sea. By the river in the demesne are *Epipactis latifolia*, *Malva moschata*, and *Stachys sylvatica* x. *palustris*—the common form, much nearer *palustris* than *sylvatica*. Between Courtown and Gorey, which is four miles inland, *Achillea ptarmica*, *Linaria vulgaris*, and *Typha latifolia* are not uncommon.

A few plants grew on the Arklow sandhills and salt-marshes, on the extreme southern edge of Co. Wicklow, which may be worth recording. On the sandhills—*Viola Curtisii*, *Eryngium*, *Euphorbia paralias* and *E. portlandica*, *Convolvulus Soldanella*. In the marshes—*Sagina maritima*, *Oenanthe Lachenalii*, *Typha latifolia*, *Carex extensa*. In the river—*Scirpus fluitans*, *S. setaceus*. On roadsides—*Erodium moschatum*, *Chærophylum anthriscus*. By far the most striking plant of the Arklow sandhills is the rare *Juncus acutus*, which grows in great tufts five feet high, and many yards in diameter.—R. LLOYD PRÆGER.

Artemisia Stelleriana.—Prof. Areschoug's statement (*Journ. Bot.*, 1894, p. 73), that the flowering season of this plant occurs rather late in autumn, while it may be true with regard to Scandinavia, does not quite agree as regards its behaviour in Ireland. I visited the North Bull on the last day of July of the present season in quest of this handsome colonist, to find it quite out of flower; by its appearance, it would appear to have been in full bloom about a fortnight before—say mid-July; but the species apparently flowers twice, at least in some seasons, for there was an abundant crop of new flowering stems rising up, which would bloom three or four weeks later. The plant grows on the North Bull, exactly in the position described by Prof. Areschoug as forming its habitat in Sweden—close to the sea-margin, among *Psamma arenaria*, and just above the zone of *Cakile*, *Atriplex*, and *Salsola*. Botanists need not go so far as the North Bull in order to acquaint themselves with the appearance of this Wormwood, as it is used as an edging to one of the beds in Leinster Lawn, and grows in the flower-border in front of Alexandra College.—R. LLOYD PRÆGER.

ZOOLOGY.

WORMS.

Bipallium Kewense (Moseley) in Ireland.—Although this remarkable species of terrestrial Planarian Worm is probably not indigenous in this country, its occurrence deserves mention, as it has made its appearance, within recent years, in quite a number of places in England. Its nearest relations live chiefly in Ceylon and China. Only two species of Planarian Worms are indigenous in Europe and in all probability will be found in Ireland, though neither of them has as yet been recorded.

Bipallium Kewense has once been obtained before in Ireland, viz. in Major Barton's greenhouses at Straffan, Co. Kildare. It was exhibited last year at a meeting of the Royal Zoological Society of London by Prof. Bell, and a second specimen has now been sent to me by Major Barton from the same locality. Like some of the slugs, it secretes a very tough slime, and I was able to observe that it suspended itself from a thread of slime, which did not break till it had reached a length of eight inches. I may mention that some excellent figures with a short description of this worm have been published by Prof. Bell in the *Proc. Zool. Soc. London*, 1886.—R. S. SCHARFF, Dublin.

INSECTS.

Heplalus lupulinus at Armagh.—On May 28th, I strolled down to Mullinure in the afternoon. Not expecting to meet with anything particular, I did not take a net with me, but merely put a few boxes into my pocket. As I was returning home, I noticed a moth flying up the lane in front of me. I made at it with my hat, knocked it down, and successfully boxed it. It proved to be a male of *H. lupulinus*. On June 1st, another specimen was brought to me by Master A. Townsend, who had caught it at Cathedral Close. Taking these captures with Mr.

Barrett's record from Galway, it would seem likely that a diligent search would produce this moth from other districts. On September 8th, I had the pleasure of adding *Oreya antiqua* to the Armagh list, by capturing a fine male in the Mullinure meadows, when beating for *Peronca*. These last were anything but plentiful, though I managed to get a couple of nice white forms of *P. variegana*.—W. F. JOHNSON, Armagh.

Smerinthus ocellatus in West Cork.—Referring to the list of moths found in Ireland in *Irish Naturalist*, October, *Smerinthus ocellatus* was taken in the County Cork, about seven miles west of Bandon, in the month of May, 1893.—C. LONGFIELD, Enniskeen, Co. Cork.

Lithosia complana in Co. Antrim.—Early in June I took a larva on Lady's Fingers (*Anthyllis vulneraria*), at Whitehead, Co. Antrim, from which I bred a fine specimen of *Lithosia complana*. Mr. Barrett kindly confirmed my identification of the species. I believe this is the first record for the North of Ireland.—W. HOWARD CAMPBELL, Londonderry.

[Mr. Kane records the species from Co. Down.—EDS.]

Cirrhaedia xerampelina and Triphosia dubitata in Co. Dublin.—On September 6th, my brother and I had the good fortune to capture a specimen of *Cirrhaedia xerampelina* at light, and on September 27th, *Triphosia dubitata*, on a window. Mr. Carpenter, who kindly determined the species for us, believes that the former is new to the Dublin district.—G. P. FARRAN, Templeogue, Co. Dublin.

Hymenoptera of Courtown, Co. Wexford.—The following aculeates, additions to my list for the district, were taken at Courtown Harbour, last August, by Mr. Freke:—*Myrmica ruginodis*, *Pompilus rufipes*, *Vespa germanica*, *Psen pallipes*, and *Caliocyx elongata*. Two species, *Tachytes pectinipes*, and *Colletes Daviesana*, which I met with very sparingly in the locality last year, were taken by Mr. Freke in some numbers there this summer. *Pompilus rufipes* is a very local insect in Great Britain, and I cannot find any previous record of its capture in Ireland.—H. G. CUTHBERT, Blackrock, Dublin.

FISHES.

The Tunny (*Orcynus thynnus*, L.) in Irish Waters.—A young Tunny was obtained on the 5th October, by Sir Thomas Brady, in a mackerel net, at Baltimore, County Cork. There have only been two or three previous Irish records—only one of which was a full-grown fish. The present specimen was 4 feet long, and weighed 57 lbs. In the Mediterranean, where the Tunny is common, it frequently attains the weight of 1,000 lbs., and preserved in oil with salt as "thon mariné," is a well-known dish in France. The Tunny seems to prey on smaller fishes such as the Herring, Mackerel, and Pilchard.—R. F. SCHARFF, Dublin.

GEOLOGY.

Kitchen Middens in Co. Donegal.—With reference to Mr. Kinahan's note in the *Irish Naturalist* for June, the statement that there is no pottery in the Rosapenna shell-mounds is incorrect. I do not say that there is plenty, but plenty to prove that pottery was used there. In March and in May last year, I found, in a few minutes, five or six pieces exactly like the White-park pottery, on one of the sites about 100 yards S. W. of the hotel. One of these pieces, the largest, I left with the manager for a little museum he was thinking of forming; it had the impressed ornament near the rim, that is so common on the White-park pottery also, evidently made with a twisted thong or fibre while the ware was soft.—R. WELCH, Belfast.

ARCHÆOLOGICAL BIOLOGY.

The Journal of the Cork Historical and Archæological Society.

For some time an annotated reprint of Charles Smith's quaint and interesting "Antient and Present State of the County and City of Cork" (1750), has been appearing as an appendix to the Journal of the Cork Historical and Archæological Society, and the work has now progressed as far as that portion of Book IV. which deals with the natural history of the County. The account as we read it in the original edition is clear enough, but in the reprint it is sufficiently puzzling. First comes the enumeration of the "fish" (from whales down to jelly-fishes), reprinted from the original without comment, but with a number of minor alterations in the text. Following this we find, to our great surprise, a second "Chapter V." in which the freshwater fishes are enumerated by Mr. A. G. More, F.L.S. This contribution is, we presume, a modern one, but there is not one word to show that we are not dealing with a portion of Smith's book, and that the distinguished writer of this chapter did not flourish in the middle of the eighteenth century. We next come to the birds, and here a fresh surprise awaits us. Smith's chapter is expunged *in toto*, and in its place we are presented with a full and excellent account of the present avifauna, by Mr. Ussher. At the head of this chapter we are told that it has been "re-written by Mr. R. J. Ussher, J.P.," which saves us from the danger of relegating another of our esteemed contributors to a distant period; but what connection his valuable list has with a reprint of Smith's History of Cork it is not easy to understand. Following the birds, are two paragraphs dealing respectively with the mammals and reptiles of the County. No clue is given as to their origin, but as they do not appear in the original book we presume they also are modern insertions. The amphibia are not mentioned, but on scrutiny, we find that the frog, toad, and newt have been classed among the reptiles! Next comes a useful list of land and freshwater mollusca, by Mr. R. A. Phillips—but again without a word to show that it is another recent insertion. Finally we have, in the last issued part (September), the commencement of Chapter VII., which is devoted to the plants of County Cork. This appears to us to be the best done portion of this very bewildering "reprint." The original account is reproduced (though not so exactly as might be desired) while, distinguished from the text by being enclosed in square brackets, are notes by Mr. N. Colgan, giving the modern synonymy of each plant, and remarks on its distribution.

While we would heartily welcome the appearance of a Fauna and Flora of Cork, bringing our information up to date, we do not quite know what to say to this strange jumble of ancient and modern science. One reflection occurs to us—the Archæological Society which in another hundred and fifty years reprints the present edition of Smith's "Cork" will have a difficult task in discovering which portions of the work represent the knowledge of 1750, and which that of 1894. It is to be hoped that the biologists of the future will not think that Irish naturalists, in the present year of grace, consider frogs to be reptiles, or whales "fish breathing by lungs."

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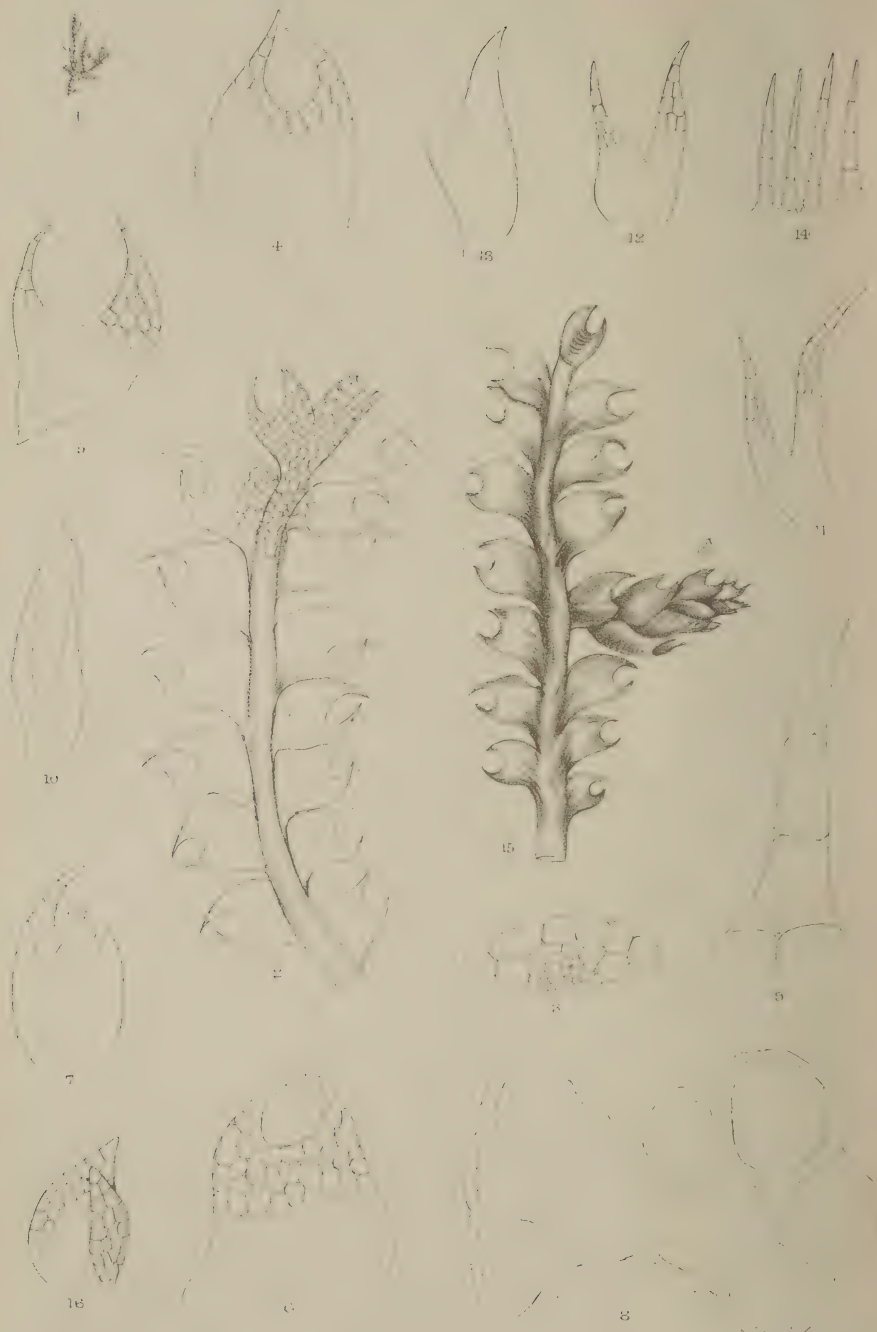
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West, Newman lith.

Cephalozia hibernica.

The Irish Naturalist.

Vol. III.

DECEMBER, 1894.

No. 12.

A NEW HEPATIC.

BY W. H. PEARSON.

CEPHALOZIA HIBERNICA Spruce MSS.

DIOICIOUS, creeping amongst mosses, with few rooting flagella, small, of a whitish, crystalline or pale green colour. Stems stout, flexuose, ramose, procumbent or somewhat erect, plano-convex, antical aspect 3—4 cells wide, postical with a band of 4 by 5 much smaller cells; branches postical, irregular, sometimes attenuate and gemmiparous, gemmæ capitate; rootlets hyaline, on the lower part of the stem, or at the apices of the arcuate stolons. Leaves approximate or contiguous, alternate, almost horizontally inserted, decurrent at the base, subulate, plane, so that the stem appears bialate, bifid from a third to the middle of the length, sinus rounded, segments subconnivent or erect, sharply acuminate, apical cells 2—4 in single series, texture delicate, cells large, hyaline, 4, 5 and 6-sided surface, pitted when dry as in *Ceph. connivens*, walls thick, trigones wanting. Stipules absent. Flowers (female) terminal on very short postical branches, bracts oblong, divided to about two-thirds into two unequal lanceolate-acuminate segments, subbract smaller, divided to about the middle, sometimes with a third small segment on one side, segments acute; bracteole oblong, bifid to about the middle or entire, unidentate near the middle, segments lanceolate-acuminate; subbracteole oval, divided to about $\frac{1}{4}$, segments obtuse, 3rd subbracteole small, slightly bifid. Immature perianths only met with, mouth fringed with long cilia, 12 to 15, each composed of 3 or 4 long, single cells. Androecia on short postical branches, perigonial bracts 4—5 pairs, closely imbricate, complicate-concave, oval, bilobed to about one-third; antheridia single, oval.

DIMENSIONS.—Stems $\frac{1}{2}$ inch long, with leaves 1·25 mm. wide ; diam. of stem, '2 mm. ; leaves, '7 mm. by '45 mm. ; segments, '25 mm., '2 mm., '5 mm. by '3 mm. ; seg., '2 mm., '15 mm., '55 mm. by '35 mm. ; seg., '2 mm., '175 mm. ; branch leaves, '35 mm. by '2 mm. ; seg., '15 mm., '1 mm. ; cells, '04 mm. by '05 mm., '05 mm. by '06 mm., '04 mm. by '04 mm. ; cells of segments, '065 mm., '02 mm., '05 mm. by '03 mm. ; bracts, 1' mm. by '35 mm. ; seg., '6 mm., '8 mm., 1'2 mm. by '35 mm. ; seg., '6 mm., '9 mm., bracteole, '85 mm. by '4 mm. ; seg., '6 mm., 1' mm. by '4 mm. ; pistillidia, '125 mm. by '04 mm. ; perigonal bract, '275 mm. by '2 mm. ; explanate, seg., '075 mm.

HABITAT.—Among *Plagiothecium borrierianum*, Spruce, on banks, Killarney, Dr. David Moore, 1865. Killarney, Mr. Reginald W. Scully, 1889.

Specimens were sent by Dr. David Moore to Dr. Carrington in 1865 as *Jung. connivens*, who, recognising it as distinct from that species, brought it under the notice of Dr. Gottsche of Altona. He referred it doubtfully to *Jung. crassifolia*, Lindenb. & Gottsch. It would probably have remained unrecorded until fertile plants were found, had not a fragment of Moore's specimen been forwarded to Dr. Spruce, who at once referred it to *Cephalozia crassifolia* (L. & G.) ; since then he received further specimens from Killarney, collected in 1889 by Mr. Reginald Scully, and wrote to me some time before his death, that he was inclined to consider the species distinct, and proposed the MS. name of *Cephalozia hibernica*. I feel doubtful until fertile specimens have been found whether it can be separated from *Ceph. crassifolia*. In any case it is a distinct addition to our Flora.

There is a strong resemblance in habit, texture, and structure of this plant to the genus *Zoopsis*, its plano-convex stem, with the band of small cells running through it, giving it a vertebrate appearance, its remarkably plane leaves, the cells of which cross the stem unaltered. It is not difficult to trace the transition from the apparent simple ribbon-like frond of *Zoopsis argentea* (Tayl.) through *Z. scutulosa*, Leitg., with its claw-like leaves, to the more perfect leaf form of *Z. Leitgebiana*, C. & P. and so to the distinctly foliose *Cephalozia crassifolia* and *Ceph. hibernica*.

It is distinguished from its nearest ally, *Ceph. connivens* (Dicks.) by its dioicous inflorescence, the longer segments of its leaves, which are composed of 2 to 4 single long cells, and other characters.

I am indebted to the late Dr. Carrington for assistance in the preparation of this paper.

DESCRIPTION OF PLATE 6.

Fig 1. Plant natural size. 2. Portion of stem, antical view $\times 24$ (Killarney, Dr. Moore). 3. Cross section of stem $\times 85$ (ditto). 4-6. Leaves $\times 64$ (ditto). 7. Branch leaf by 85 (Killarney, R. Scully). 8. Portion of leaf $\times 290$ (Killarney, Dr. Moore). 9. Portion of segment of leaf $\times 290$ (ditto). 10, 11. Bracts $\times 31$ (ditto). 12, 13. Bracteoles $\times 31$ (ditto). 14. Portion of the mouth of an immature perianth $\times 31$ (ditto). 15. Portion of male stem, antical view $\times 31$ (Killarney, R. Scully). 16. Perigonal bract $\times 85$ (ditto).

THE IRISH FIELD CLUBS.

BY R. LLOYD PRAEGER, B.E.,

Secretary, Dublin Nat. Field Club; Ex-Secretary, Belfast Nat. Field Club.

III.—THE CORK AND LIMERICK NATURALISTS' FIELD CLUBS.

WE now come to deal with the two Field Clubs which have recently been founded in the South of Ireland, and I take the earliest opportunity of acknowledging my indebtedness to their Secretaries, Mr. J. L. Copeman of Cork, and Mr. Francis Neale of Limerick, for the full information respecting their Clubs which they kindly placed at my disposal for the purposes of the present memoir. The history of these Societies is short, when compared with that of the Belfast Club, or even with that of the Field Club of Dublin—three and two years respectively, compared with thirty-two and eight years, and the exigencies of space demand that the present notice of them should be correspondingly brief. Not that we consider these young Societies one whit less important than the elder brethren in Ireland; their foundation is one of the most interesting events in the recent history of Irish science, more especially when the proximity of their head-quarters to that surpassingly attractive biological region, the extreme south-west, is considered. Irish naturalists should not only wish these Clubs every success, but, in the interests of Irish science, they should endeavour to ensure that success by whatever means lie in their power.

The foundation of the Cork Naturalists' Field Club is to be ascribed to one who still appropriately holds the office of

Secretary, Mr. J. L. Copeman, who, on 25th February, 1892, read a paper before that important local body, the Cork Literary and Scientific Society, entitled, "A Plea for a Society's Room, Field Club, and Museum." The discussion on this paper showing that some interest in the subject had been aroused, it was followed by a meeting in the Crawford Municipal Buildings, on 18th March, convened by a circular signed by Mr. Copeman, with the object of founding a Field Club in Cork. This meeting was attended by about 40 persons; resolutions were passed, approving the proposal; a code of rules, very similar to those which govern the Belfast and Dublin Clubs, was adopted, and the following officers were nominated and subsequently elected:—President, Prof. Marcus Hartog, D.Sc.; Hon. Vice-President, Rt. Rev. Dr. Sheehan; Vice-Presidents, Denny Lane, M.A., W. H. Shaw, M.A., W. J. Knight, LL.D., J. Cotter, M.D.; Treasurer, John Gilbert; Curator, R. A. Phillips; Secretaries, W. B. Barrington, J. L. Copeman; with a Committee of ten Members. Rooms for meetings were obtained in the Crawford Municipal Buildings; a local museum was founded; and the Cork Field Club entered on a life which will, we trust, be a long and prosperous one. The first business meeting was held on 1st April, when the President inaugurated the first session with a "Gossip on Pond Life." The first excursion was held on 18th April, when the historic neighbourhood of Blarney was visited by some 36 members and friends; on this occasion, Mr. J. O'Sullivan made the munificent offer to hand over to the Club the whole of his large local herbarium, when accommodation was provided for its reception. During the ensuing summer and winter, a large number of excursions and indoor meetings were held. The first annual meeting took place on 17th April, when, according to the official notice sent to this Journal, the report "showed a highly creditable position." The membership stood at 89, and the financial position was good. The Officers and Committee were in most part re-elected, the only noteworthy change being the appointment of Miss Martin as a Vice-President, in place of Dr. Cotter.

The second year was quiet, but many places were visited, and a number of scientific subjects discussed, and on the whole, the interest in the Club proceedings was fairly well

maintained. The second annual report, presented to the members on 11th April, 1893, shows a membership of 50. Three winter meetings and seven excursions had been held; the very sensible suggestion is made, that one well organized meeting per month is as much as should be attempted. The want of a Club Room, and of accommodation for the Museum are referred to. The principal office-bearers were again re-elected; Mr. T. Farrington, M.A., succeeding Dr. Knight as a Vice-President. The Treasurer reported a substantial balance in hands.

Of the present year, the most important event has been the three-day excursion to Fermoy and Lismore, held in conjunction with the Dublin and Limerick Field Clubs, on which occasion the Cork Club was represented by two Vice-Presidents and the Secretary, as well as seven other members. The attendance at the other excursions has not been so large as hitherto, and the membership at present does not exceed 40, but this decrease does not necessarily signify any diminution in the Club's efficiency. While a society is new, there will always be found people who will join it, only to drop away when the novelty has worn off. Such members leave but little trace behind them, and indeed their sphere of usefulness is generally limited to the amount of their subscriptions. The Workers are more constant in their affections, and, though it is encouraging to have a larger audience before whom they may lay the result of their labours, they display none the less zeal because the circle is diminished.

Of the youngest of our Clubs, the Limerick Naturalists' Field Club, the story is soon told. It owes its origin to Mr. Francis Neale, formerly a useful entomological member of the Dublin Club. On his removal to Limerick, four years ago, he found in Mr. Joseph Stewart and Dr. W. A. Fogerty, two men whose tastes were somewhat similar to his own; and as a result of various conversations, a meeting was summoned by circular for 13th December, 1892, when the promoters brought forward their suggestion for the formation of a Naturalists' Field Club in Limerick, and submitted a simple set of rules. The meeting, which was attended by some 20 persons, adopted the suggestion therewith; Mr. Archibald Murray was appointed President; Dr. Fogerty, Vice-President;

Mr. Stewart, Treasurer ; Mr. Neale, Secretary ; who, with three additional members, formed the Committee. With regard to the rules, we may remark that the annual subscription was fixed at half-a-crown, being one-half of the amount which is payable in the other Irish Clubs. Twenty-two names were enrolled at this meeting ; and at the end of three months the list had increased to 45. The first regular meeting took place on 17th January, 1893, when Dr. Fogerty described "Some Low Forms of Animal Life." Since that date, monthly meetings have been regularly held ; the winter meetings being well attended, and decidedly successful. The summer excursions presented greater difficulties, on account of the small number of members who have taken up any definite branch of collecting ; but the founders of the Club had no reason to be dissatisfied with their first season's work. The first annual meeting was held on 16th January, 1894. The statement then submitted showed that the membership was steady, and the finances in a satisfactory state. Mr. E. Taylor was elected a second Vice-President, and the Committee underwent some change. It is a matter of regret that unforeseen circumstances prevented several members from fulfilling their intention of attending the joint excursion to Fermoy, where the discussions and interchange of ideas on Field Club work would have been sure to encourage and stimulate them ; but we note that, at the other excursions of the present year, the attendance has been satisfactory, and that the membership still steadily retains its original figure, about 45. Placed as they are, in the midst of a district varied and interesting, and about which there is still much to be learned, the members of the Limerick Naturalists' Field Club are certain to derive an increasing pleasure and interest from the study of local Natural History, and should not regret the day when they banded themselves together for mutual intercourse and combined study.

I have now sketched briefly the history and fortunes of the Field Clubs of Ireland. The record is a creditable one, especially when we take into consideration the lack in Ireland of a general interest in Natural History when compared with England or many parts of the Continent. Four working Clubs for over 31,000 square miles of country is certainly a very

modest allowance, but we must be content, and hope for better things to come. It may be noted that the larger Field Clubs are located on the east coast, whereas the most interesting regions for the naturalist lie along the western seaboard; the future Field Clubs of Galway and Sligo will have a glorious district for investigation lying at their very doors. Yet the eastern districts offer a wide and varied scope for the biologist, and the Clubs are steadily fulfilling their mission of investigation. The "Flora of the North-east of Ireland," the "Guide to Down and Antrim," and the "Systematic Lists," published by the Belfast Club are worthy of any scientific society, and the numerous papers which appear in these pages from the pens of Dublin Field Club members show that that Society is pursuing its appointed course. Nor have the members of the Cork and Limerick Clubs failed to contribute to the pages of the *Irish Naturalist*.

Glancing generally at the story of the Irish Field Clubs one or two facts become apparent. We note, for instance, that financial matters, the stumbling block of so many organizations, have never been a source of difficulty; the treasurer's duty has always been plain sailing, and the crux—when crux there was—has been the small number of members whose interest in natural science was sufficiently keen to induce them to support their Club by a regular attendance, by the steady pursuit of some branch of research, and by the contributing of papers at the winter meetings.

Another prominent fact is that there is often a period in the history of such Clubs, generally a few years after their foundation, when the novelty of their existence has worn off, which requires all the pluck and pertinacity of the executive to steer their ship through. We have seen that the Dublin Club passed through a most severe climax of this kind, which, fortunately, it safely weathered, and emerged into a steady prosperity. The successful and influential Field Club of Belfast also saw its evil days during early years, and though matters never assumed the critical condition that imperilled the existence of the Dublin Club, still they had up-hill work for a while. The two younger Clubs may still have difficulties of this kind before them. The rapid fall in membership of the Cork Club seems to show that their history is repeating itself; but we trust that the lowest ebb has been reached, and that Mr.

Copeman's laudable efforts will meet with the success which they deserve. The Limerick Field Club appears to be quietly pursuing its course, and it is possible that its exceedingly modest beginning may save it from the danger of a relapse.

But cannot the now successful and, one might say, powerful Clubs of Belfast and Dublin encourage and assist their southern brethren? Will their members look calmly on while these young societies fight the hard battle of life, without stretching out a helping hand? Valuable assistance they can give, and that easily; and it would be unworthy of the traditions of either Club if such aid were not tendered promptly and generously. Is it not in fact desirable in the highest degree that all the Irish Field Clubs should assist each other; that they should know each other better, and feel that they are comrades, working together for a common object; that there should exist a bond of friendly communication between them, and that as frequently as possible the members of the various Clubs should meet each other? These questions have had the earnest consideration of the Secretaries of the Irish Field Clubs for some months past, and the result of their consultations will shortly assume the form of a definite proposal. It is suggested, in short, that an Irish Field Club Union should be formed, the business pertaining to which will be carried on by a committee composed of representatives of all the Clubs; that the Union should have for its objects the consideration of matters of general Field Club importance, the providing of mutual help among the Clubs, and the bringing about, by means of joint meetings and otherwise, of a closer and more frequent intercourse. Pending the general conference of the Irish Clubs, which it is proposed to hold next summer, a memorandum, embodying the above suggestions, will shortly be submitted to each Club, in order that the benefits which will arise from the Union may come into operation as early as possible. At next year's conference it is confidently anticipated that the foundations will be laid of a true and lasting Union, a bond of sympathy and friendship and scientific intercourse that will help the Clubs in their work, and stimulate them in their forward march; a Union which will be a pillar of strength to the Field Clubs, an aid to British science, and a credit to Ireland.

THE STRIDULATION OF CORIXA.

BY GEORGE H. CARPENTER, B.SC.

IN the May number of the *Irish Naturalist* (p. 114), a note by Mrs. Thompson, of Cork, recorded the interesting observation that a small water-bug of the genus *Corixa* had been heard to produce two distinct sounds. One was of rare occurrence and resembled the twittering of a bird; the other, frequently heard, was a continuous shrill note, like the chirping of a grasshopper. Mr. E. Saunders, F.L.S., well known as a high authority on the hemiptera, had never heard of the power of these insects to make such sounds. Mrs. Thompson's observation was, therefore, sufficiently noteworthy, though the cause of the stridulation remained doubtful. Mrs. Thompson noticed, however, that the singing was accompanied by a motion of the front pair of legs.¹

In view of the problem presented, it is with much satisfaction that I find that similar sounds have been recently heard by a French naturalist, M. Ch. Bruyant, from a water-bug, *Sigara minutissima*, of much smaller size than the species of *Corixa*. He believes these sounds to be caused by the motion of comb-like rows of bristles, situated upon the front feet, across the rostrum or beak of the insect. A translation of his remarks² may be of interest.

"The tarsus of *Sigara* is formed of a single joint—the *pala* of authors. It is simpler than that of *Corixa*. It presents the form of a somewhat irregular oval, and carries at its distal extremity a thick, stiff bristle which a high power shows to be bifid. The lateral anterior edge is armed with a series of strong, equally rigid bristles, usually as many as thirteen or fourteen in *C. minutissima*; these bristles appear to be inserted in some hollows of the integument. The lateral posterior edge, on the other hand, has only a few. . . . These strong bristles moved rapidly across the beak produce the stridulation which we have mentioned, a monotonous sound, not metallic, but exactly like that which the teeth of a comb produce by playing on the edge of a thin plate; indeed, the two instruments are present [in *Sigara*], but they are microscopic."

But M. Bruyant's paper was specially welcome in affording a reference to a similar observation upon some species of *Corixa*, thus confirming Mrs. Thompson's note. This is due to a German naturalist, Dr. Schmidt-Schwedt, who records it in a chapter on insects contributed to Dr. Zacharias' work on

¹Mrs. Thompson has, since the publication of her note, told me that the "two appendages" therein mentioned were, doubtless, the front legs.

²*Comptes Rendus*, vol. cxviii., 1894, p. 299.

fresh-water plants and animals.¹ A translation of his remarks on the subject reads as follows:—

“The front pair of legs present a peculiar shovel-like appearance. Together with the beak, they act in some species (or in all ?) as a musical instrument. I have heard, only always in the evening, rather loud and continuous “music” from insects which I have kept. They remain under water, keeping the middle legs still, and fiddle on the beak with the front legs. The synchronism of the sound with the motion of the legs was clearly observed.”

It will be seen that Dr. Schmidt-Schwedt records only one kind of sound, evidently the shrill note heard by Mrs. Thompson. He observed the stridulation only in the evening, while Mrs. Thompson, though finding the sound then to be continuous, heard it also at intervals during the day.

Being curious to know exactly what structures on the front legs produce the stridulation, I have made a microscopic examination of these limbs in several species of *Corixa*. There is a general tendency in aquatic insects, towards a shortening and thickening of these legs, while the intermediate and hind pairs remain relatively longer, the latter usually functioning as oars. Most kinds of water-beetles afford good illustrations of this fact. Among the water-bugs (*Cryptocerata*) we notice that in *Notonecta* the front legs are but little modified, closely resembling the middle pair. In *Nepa* and *Ranatra* these limbs are adapted for seizing prey, but in *Corixa* and *Sigara* we find them much shortened and thickened. All the divisions are stout, and the tarsus or foot consists of only a single joint. This has the shape of an irregular “half moon” (fig. 1.), whose inner or concave edge is directed downwards and inwards, in the ordinary position of the limb. This inner

Fig. 1.

Right front tibia
and tarsus of *Corixa*
Linnei.

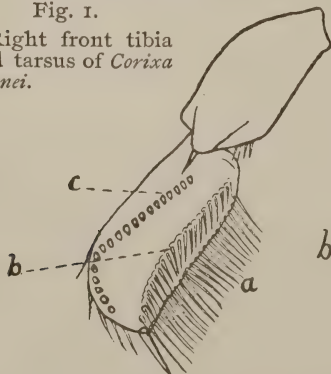
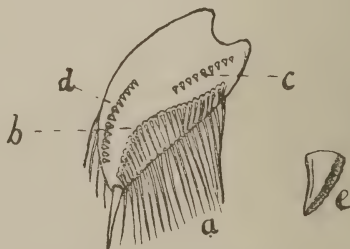


Fig. 2.

Right front tarsus of
Corixa striata.



¹Die Tier und Pflanzenwelt des Susswassers. Leipzig, 1891 (vol. ii., p. 114).

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R. LLOYD PRAEGER, B.A., B.E., M.R.I.A.

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ERRATA.

Page 159, at beginning of line 1, insert May 17th.

„ 222, line 27, for "*Lygus*," read "*Stygnus*."

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edge is provided with a row of numerous, closely-set bristles or cilia (fig. 1., a) while a raised keel, with another row of rather stronger bristles (fig. 1., b) runs in a curve over the inner face of the joint, both ends terminating at the inner (lower) edge. These rows of bristles, which are found on the feet of both sexes, are not, I believe, strong enough to produce the music which has been heard from the insects. But, in the males of all the species which I have yet examined, I find situated between the second row of cilia and the outer edge of the foot, a row of strong, deeply set teeth (fig. 1., c). I have no doubt that the shrill note of *Corixa* is due to the vibration of this "comb," quickly drawn across the face. A single row of teeth, like that shown in fig. 1., seems to be usually present in the males of *Corixa*. In *C. striata*, however, this has been divided into two short rows (fig. 2.), the proximal of which (c) is situated towards the middle of the inner face of the foot, and the distal (d) towards the outer edge. In most of the species, the teeth resemble blunt pegs, but in *C. striata* they are sharp and conical (fig. 2, e).

The individual *Corixa* which was heard by Mrs. Thompson, was kindly forwarded by her, but arrived in too broken a condition for specific determination. Its sex, however, was evident, and it was a male. It seems clear, from the absence of the sound-producing teeth on the feet of female *Corixæ*, that singing, in these insects, is an accomplishment reserved for the males; a similar state of things to that found in other stridulating insects, such as the cicads, which were congratulated by the ungallant poet, upon having "silent wives." The "song" doubtless serves as a call-note to the female.

Across what particular part of the face the comb is drawn, will perhaps be discovered by careful observation of living *Corixæ* in the act of stridulation. The nature of the rarer, twittering note heard by Mrs. Thompson, must also remain doubtful for the present. She noticed that, while the shrill note was accompanied by a lateral motion of the legs, the twittering was due to their upward motion. I find upon the femora a large number of irregularly arranged, stout spines, and an upward motion of the limb would bring these into contact with the edge of the face, or of the coxal cavity. Vibration set up in this way, might perhaps be the cause of the peculiar twittering sound.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a Peafowl from Mrs. Prince; a white rat from Miss Lewers; a Starling and some Crayfish and Roach from P. Mahony, Esq.; a cockatoo from Miss M. Little; a Rosella from Master P. Little; three toads from Miss Nugent; a Fox from J. F. D'Arcy, Esq.; a pair of Call Ducks from S. Brunton, Esq.; numerous fresh-water fish from F. Godden, Esq.; an Indian Mynah from J. B. O'Callaghan, Esq.; and a Barn Owl from R. M. Barrington, Esq. A Llama has been born in the Gardens, while ten Curassows, six Black-headed Ibis, and three American Night-herons have been received on deposit.

We regret to have to record the death of the young female Chimpanzee. 8,600 persons visited the Gardens in October.

DUBLIN MICROSCOPICAL CLUB.

OCTOBER 25th.—The Club met at Mr. HEDLEY'S, who directed the attention of the members to a thread worm about $2\frac{1}{4}$ inches in length, and stated that he had found this worm infesting the Common Earwig. He had found the nematode free in the garden soil, and had also found a nematode in hyacinth bulbs, but whether the latter and that infesting the ear-wig were identical he could not offer an opinion although there did not appear to be any macroscopic difference. The life, history and name of these nematodes he had failed to make out, although he had submitted specimens to several observers.

Mr. F. W. MOORE showed *Sphaerospora binominata*, Massee, n. sp. Dr. Johnson collected at Bundoran specimens of *Jungermannia turbinata* which he forwarded to Glasnevin. When examining these, a fungus was detected growing on them, and specimens were forwarded to Mr. Massee, who made it out to be a new species and named it as above. It has not yet been described.

Mr. G. H. CARPENTER showed male and female specimens of the sea-midge, *Clunio marinus*, Halid., taken at Killiney, in April, on the Dublin Field Club excursion. The insect, except for a single record from Hastings, appears to have been overlooked since Haliday took it forty years ago in Dingle and Dublin Bays. The male only was known to him. The female, which proves to be wingless, and with legs and antennæ much shorter than those of the male, was, together with a larva discovered on the same occasion, described and figured by exhibitor in the *Ent. Mo. Mag.*, June, 1894.

Mr. M'ARDLE exhibited a specimen of *Lejeunea hamatifolia*, Hook., an extremely minute liverwort which was in fruit. The perianths are obovate, distinctly ribbed with five prominent and acute angles, which extend from the base to the apex, serrated, the mouth is contracted, elevated, and tubular, cut into fine sharp teeth. The specimens were collected by Mr. M'Ardle in November of last year at O'Sullivan's Cascade, Killarney, where it grows plentifully, but is very rarely seen in the fruiting condition.

JUNE 21st.—Mr. F. W. MOORE showed portion of a species of *Utricularia* bearing several bladders. The plant of which part was shown had been imported from South America, growing on a *Bromelia*. It forms thin running stems which intertwine amongst the leaves of the *Bromelia*, and bear large peltate leaves, one to two inches in diameter. At intervals,

root-like branches are given off. These are very fine, and bury themselves in the water at the base of the leaves of the *Bromelia*, on which the *Utricularia* has taken up its abode, eventually bearing numerous bladders which are covered by the water, and in which they float about fully expanded.

[The above notice of exhibit was received too late for our report of this meeting (p. 200).]

BELFAST NATURALISTS' FIELD CLUB.

SEPTEMBER 15th.—A party numbering 120—the largest turn-out of the season—drove from Belfast over the hills through Crumlin to Langford Lodge. The interesting historic, and other relics in the house, which was kindly thrown open by its proprietor, Rev. A. Pakenham, J.P., excited much interest. The adjoining gardens and woods were examined, after which the majority of the party proceeded by boat to Ram's Island, to inspect the round tower, &c. Tea was subsequently served on the lawn, after which the return journey was made. Very little field-work was done on this excursion.

OCTOBER 26th.—The winter session was opened by the usual social meeting in the Exhibition Hall of the Royal Botanic Gardens, when there was a large attendance of members and friends, notwithstanding the very inclement weather. The upper portion of the hall had been beautifully arranged with plants and flowers, mingled with fountains and fairy lamps, by Mr. Charles M'Kimm, the curator of the Gardens, whilst the walls of the other end of the hall were covered by a collection of fern fronds, grown by Mr. W. H. Phillips, and not to be easily equalled for rarity and appearance. Tea was made by the ladies of the Club from seven till eight o'clock, when most of the company had arrived. After tea, the President, Mr. F. W. Lockwood, C.E., bade all welcome to this the annual exhibition of the Club's work, and pointed out the different exhibits. The principal one contained a collection of geological specimens, illustrating the Carboniferous formation, including some fine ornaments made from coal, lent by Mr. James Stelfox, C.E. This exhibit was under the care of Messrs. William Gray, M.R.I.A.; Joseph Wright, F.G.S.; and Alexander G. Wilson. The side walls were covered by a large collection of photographs taken during the season by the members on the Club's excursions; also, an explanatory geological series by Mr. R. Welch, and a comprehensive set of ethnographical views illustrating some of the manners and customs of the inhabitants of Ireland. Mr. John Vinycomb, M.R.I.A., with his usual taste, exhibited a lovely series of *Ex Libris*, a subject upon which he is now accepted as an authority, whilst Mr. Ernest Hanford displayed a representative series of water colours, illustrating the favourite district of Cushendall. Mr. John Hamilton excited much interest with the objects in his aquaria. Fifty rare Irish plants collected during the past season, for which a special club prize had been awarded, were exhibited by Mr. R. Lloyd Praeger, M.R.I.A. Stereoscopic views were shown by Dr. Cecil Shaw, and under the guidance of Dr. St. Clair Boyd there was a goodly display of microscopes by the members of the Club. Mrs. Allen, of Stormount Castle, exhibited a huge Tarpon, whose silvery scales attracted much admiration. Mrs. White-Spunner had on view her huge album of Irish flowering plants, which was shown at the Chicago exhibition. A lantern exhibition was given during the evening, when a series of sea-gull photos. were shown and some Club excursion views, taken by Messrs. Welch, Gray, Leslie, and MacLean. After the lantern a short business meeting was held, when twenty-five new members were elected, bringing up the total membership to about 500, the largest ever reached in the history of the Club. The president announced that Professor Cole would commence his course of lectures on "The Story of Life on the Globe" in January

next. All who intend to join the course should apply at once to Miss S. M. Thompson, the Hon. Geological Secretary, or to the Secretary of the Club.

DUBLIN NATURALISTS' FIELD CLUB.

SEPTEMBER 29th.—The excursion season was brought to a successful close by a fungus foray to Woodenbridge, Co. Wicklow. A party of over thirty left Harcourt-street by the ten o'clock train, favoured by magnificent weather. Woodenbridge was reached at noon, and, by kind permission of Col. Bayley, the naturalists were soon dispersed through the beautiful woods of Ballyarthur.

The woods were unusually dry, in spite of the lateness of the season, and there was in consequence a distinct absence of many species which would no doubt have otherwise been taken. Moulds and the minute and more delicate hymenomycetes were not to be found. Not a single *Cortinarius* was observed, and the only Pezizoid discomycete encountered was the *Chlorosplenium* which was found in perfect fruit. Undoubtedly the best find of the day was that of *Cyathus striatus* which was detected growing on the ground by Miss Hopkins. The following complete list of fungi taken has been kindly furnished by Dr. M'Weney, who conducted the party and identified the captures. *Hydnum repandum* L., *Clavaria cinerea*, Bull., *C. cristata*, Holmsk., *C. coralloides*, L., *C. fusiformis*, Sow., *C. contorta* Fr., *Lycoperdon* (two species), *Scleroderma vulgare*, Fr., *S. geaster*, *Phallus impudicus*, L., *Cyathus striatus*, Hoffm., *Sepedonium chrysospermum*, Lk., *Puccinia luzulæ*, *Chlorosplenium æruginosum*, Tal., *Amanita muscaria*, Linn., *A. rubescens*, P., *Lepiota excoriata*, Schieff., *Armillaria mellea*, Vohl., *Tricholoma columbetta*, Fr., *Laccaria laccata*, Scop., *Clitocybe nebularis*, Batsch., *Entoloma jubata*, Fr., *Hypholoma fascicularis*, Fr., *H. sublateritia*, Fr., *Stropharia æruginosa*, Curt., *S. semiglobata*, Batsch., *Psilocybe semilanceata*, Fr., (ringed form), *Panaeolus fimiputris*, Bull., *Coprinus micaceus*, Fr., *Paxillus involutus*, Fr., *Lactarius turpis*, Fr., (and two other species unidentified), *Russula emetica*, Fr., *R. ingricans*, Fr., *Cantharellus cibarius*, Fr., *Hygrophorus calyptraeformis*, B. and Br., *H. chlorophanus*, Fr., *H. pratensis*, Fr., *Boletus flavus*, With., *B. subtomentosus*, Fr., *B. edulis*, Bull., *B. pachypus*, Fr., *B. scaber*, Fr.

Mr. D. M'Ardle secured the following liverworts:—*Lunularia cruciata*, Linn., *Cephaloxia divaricata*, Smith var. (rare), *Lophocolea heterophylla*, Schrad. (very scarce), and *Trichocolea tomentella*, Erhart. This curious liverwort was gathered in some quantity by Miss Constance Pim. It occurs in almost every county sparingly, excepting Kerry, where it is often found growing in large masses. The branches are from two to four inches long, not unlike some mosses of the *Hypnum filicinum* group. The leaves are unequally two-lobed, each lobe divided and sub-divided into long ciliary fringes. The stipules or under leaves are cleft into two portions, which are fringed with cilia, giving the plant a spongy appearance, and it is capable of imbibing large quantities of moisture. It is one of the plants selected and described by Mr. Jesse Reves in a series of articles on "Adaptation in Liverworts" in *Natural Science*, vol. iv., p. 195, March, 1894. *Diplophyllum albicans*, Linn., *Nardia crenulata* (Smith), Lindberg, and *Nardia gracillima* (Smith), Lindberg, were also taken.

Mr. Carpenter secured among beetles *Chrysomela polita*, and among two-winged flies *Tipula dispar*, Halid., an interesting crane-fly, whose female has aborted wings. Spiders were numerous, and included *Zora spinimana*, *Linyphia insignis*, *L. hortensis*, *Gonatium rubellum*, and *Lycosa lugubris*. The local harvestman *Phalangium parietinum* was also taken.

The party returned to town by the five o'clock train, well satisfied with the day's work.

OCTOBER 30th.—The Club opened their eighth winter session with a successful conversazione in the rooms of the Royal Irish Academy, which were courteously placed at the disposal of the Club by the Council.

At eight o'clock the President of the Club (Mr. G. H. Carpenter, B.Sc.), who was attended by the Secretary (Mr. R. Lloyd Praeger, B.E.), took the chair, and opened the proceedings. He bade welcome to the many members and visitors present, expressing the hope that many of those who now came as visitors would soon attend as members. He referred to the success of the summer excursions of the Club, now over for the season, and especially to the important joint meetings that had been held at Drogheda in connection with the Belfast and North Staffordshire Naturalists' Field Clubs, and at Fermoy in conjunction with the Field Clubs of Cork and Limerick. Such meetings of the different clubs were sure to assist their mutual aims. He was pleased to say that arrangements were in progress for the holding of a conference of all the Irish Field Clubs next year at Galway, when they would together explore the lovely and interesting district of Connemara, and take council together regarding their mutual interests.

He then called on Mr. David M'Ardle, who showed some specimens and lantern-slides of rare Irish liverworts. These plants grew in damp places, and among moss, and many of them were of much beauty and rarity, and their distribution on the surface of the globe was very peculiar. Mr. R. Welch, of Belfast, next showed a series of lantern views from photographs taken on the recent excursion of the Belfast Naturalists' Field Club to Portsalon and Rosapenna, North Donegal; also a fine set of seagulls on the wing, taken from Southport Pier and on the Northumberland moors. Mr. Carpenter followed with photographs, by Mr. F. T. Eason, of the Irish house-spider (*Tegenaria hibernica*) and its web. A second lantern exhibition was given later in the evening, when Professor Sollas, F.R.S., showed a photograph of a model, produced by spreading a sheet of gold-leaf over a film of gelatine, and allowing the latter to dry slowly. The puckerings and cracks, and circular elevations caused by air bubbles which are produced in the goldleaf resemble in a remarkable degree the features of the moon's surface. Dr. M'Weeney exhibited a very fine series of bacilli of diseases, such as diphtheria, cholera, and tuberculosis, and explained lucidly the nature of these minute organisms. Professor Haddon subsequently described a series of beautiful views, by Mr. R. Welch, of Irish country life, illustrating the occupations, conveyances, and monuments of the people in the more remote parts of the country.

Displayed on tables in the various rooms were a large number of exhibits of scientific interest. These included microscopical preparations of the sea-midge, *Clunio marinus*, shown by the President. The male of this insect, though very rare, was known to occur in the district, but the female, which was also shown, has never been found before it was taken on the Club's excursion to Ballybrack in April last. Mr. H. K. G. Cuthbert showed an interesting set of inquiline Hymenoptera and their hosts. Mr. J. N. Halbert exhibited local insects taken in Ireland during the year, among which were several not previously found in the country. Professor A. C. Haddon, F.Z.S., showed specimens of Irish Foraminifera, and enlarged models of the same, which gave an excellent idea of the beautiful and varied shells of these minute organisms. Professor T. Johnson, D. Sc., was represented by a series of Irish sea-weeds, and some microscopical botanical preparations. Several interesting specimens from the Science and Art Museum were exhibited, including the beautiful green fungus *Chlorosplenium*, found by Miss Kelsall, and some fossil corallines from Dublin Bay, by Professor O'Reilly. Mr. F. W. Moore, F.L.S., exhibited a number of rare exotic plants in the live state, including insectivorous species. Dr. Scharff, B. Sc., contributed a collection of the land and fresh water shells of County Dublin—a very complete series; and also showed the first Irish specimens of a planarian worm, *Rhynchodemus terrestris*. Professor Grenville Cole had on view a magnificent series of photographs taken among the higher Alps by the late W. F. Donkin; he also exhibited models and photographs illustrating

the results of earth movements. Mr. Turlough O'Brien showed a hornet's nest taken in Middlesex. Mr. R. Welch was to the fore with a good series of his well-known photographs illustrating Irish geology and ethnography. One of the principal exhibits consisted of a large table on which, amid living ferns and grasses, a large collection of fresh Fungi were naturally arranged as if growing on a green sward of mosses, each species bearing its scientific name. There were agarics of all shapes and sizes; boleti, puffballs of various kinds, hydnums and polypori. The whole exhibited a wonderful variety of form, and almost every shade of colour—greens, purples, scarlets, browns, yellows, and whites, and showed in a striking degree the variety and beauty of this class of plants. This series was collected chiefly at Dundrum and Howth by Mr. and Mrs. J. T. Tatlow, Miss C. Gardiner, and Mr. Praeger, and, considering the lateness of the season and the inclemency of the weather, it formed a very striking display of local fungi.

At 9.15 the President again took the chair, and called for nominations of new members. The Secretary read the list of nominations sent in, and the President announced that these would be balloted for at next meeting. After a further display of lantern-slides, under the management of Mr. Greenwood Pim, F.L.S., the exhibits once more claimed attention, and the members did not disperse until a late hour.

NOVEMBER 13th.—The Vice-President (PROF. COLE) in the chair. Mr. J. N. HALBERT gave an account of the insects taken on the Club's three-day excursion to Fermoy and Lismore in July last, and exhibited the specimens. This paper will shortly appear *in extenso* in our pages. Prof. Haddon, Mr. Duerden, and the Chairman complimented the reader on the industry displayed by his list of captures.

Mr. R. LLOYD PRAEGER gave a lecture on the varieties of British Ferns. He said that this group of plants exhibited an extraordinary power of variation, unequalled in any other branch of the vegetable kingdom. With the aid of numerous lantern slides and some hundreds of dried fronds, he demonstrated how in general the most extreme forms were developed by a process of regular evolution from the type, and how, in various species differing widely from each other in appearance, the types of variation run in different parallel lines. He finished with some reference to crossed varieties, and to the several interesting new modes of reproduction that have recently been discovered in certain varieties of British ferns.

Prof. Haddon, Mr. Duerden, and the Chairman criticised the paper, after which Mr. Praeger replied.

The following new members were elected:—Mrs. W. Haughton Baskin, Mrs. Bradford, Miss Brown, N. M. Falkiner, M.B., Miss E. J. Haughton, Miss K. M. N. Maguire, M.D., Mrs. Minchin.

ROYAL IRISH ACADEMY.

NOVEMBER 12TH.—Dr. R. F. SCHARFF read his report on the origin of the Land and Freshwater Fauna of Ireland. His conclusions, based chiefly on the geographical distribution of Mammals, were as follows:—That the entire fauna (except those species which originated in the country) migrated to Ireland from Great Britain in Pliocene times, and that at that time the central portion of the Irish Sea was a freshwater lake. The southern land connection between Wales and the south of Ireland broke down at the beginning of the Pleistocene system, whilst the northern one with Scotland persisted for some time after. The Irish Sea was thus converted into a marine estuary, and the freshwater fauna to a large extent driven to smaller lakes to the east and west of it. A fuller paper dealing with this highly interesting subject is promised for an early date.

NOTES.

BOTANY.

PHANEROGAMS.

Bristly Ox-Tongue in Co. Wexford.—I found *Helminthia echioides* at Kilmanock, Co. Wexford, in October, 1894. It has previously been recorded for the Co. Wexford by Mr. H. C. Hart and Miss L. S. Glascott, but is very rare. I sent a specimen to Mr. J. H. Burnill, Curator of the Cambridge University Botanical Museum, for identification.—G. E. H. BARRETT-HAMILTON, Kilmanock, New Ross.

ZOOLOGY.

INSECTS.

Asphalla flavicornis at Lough Swilly, Co. Donegal.—On 26th July, 1883, we took a larva of *A. flavicornis* on birch near Buncrana, and on 3rd August another at same place. One of them died; from the other we reared an imago, on 7th March, 1884. On 14th June, 1884, we beat another larva from birch at Rathmullen, but did not succeed in rearing it. By an editorial mistake this species was wrongly entered as *C. or* in my list of the Lepidoptera of this district (*I. Nat.*, January, 1893.) It is satisfactory to know that this moth may, therefore, be reinstated in the Irish list.—D. C. CAMPBELL, Londonderry.

MOLLUSCS.

A supposed new Species of Limax from Ireland.—Another new species of slug from Ireland is described by Mr. W. E. Collinge (*Journal of Malacology*, Vol. 3, No. 3, 1894), but although he remarks—"Anatomically there seems to be little doubt but that there are sufficient grounds to separate it from any other known species of the genus," yet he acknowledges that "it is a form of *L. maximus*, possibly sufficiently distinct to be regarded as another species." Before definitely adding the species to our list of Irish slugs, we must wait for further details and figures which are promised.—R. F. SCHARFF, Dublin.

Shells from Co. Donegal.—The following is a list of the shells collected by Mr. R. Welch in Co. Donegal, on the long excursion of the Belfast Field Club and at other times:—BUNDORAN: *Helix nemoralis*, type and 10,345 in about equal numbers; var. *castanea*, alive, but denuded of their epidermis by drifting sand, plentiful; var. *libellula*, one specimen; var. *hyalozonata*, with white lip (= var. *albolabiata*), two specimens. RATHMULLEN: *Helix rufescens*, two specimens of type. ROSAPENNA LINKS: *H. ericetorum*, dark form, and *H. acuta*. BOTTOM SHORE: *H. nemoralis*, type, one a pretty shell with the second band reduced to dots, = 1:345 band formula; *Helix ericetorum*, very fine, and mostly bandless.

Rejectamenta from PORTSALON LINKS yielded *H. pulchella*, *Pupa muscorum*, *Hyl. fulva*, *Carychium minimum*, *Coch. lubrica*, and *Vertigo angustior*. With these a good many specimens of *Rissoa striata*, *R. costata*, and *R. parva* occurred, and one specimen of *Lepton Clarkia*. Rejectamenta from BOTTOM SHORE, Portsallon, contained great numbers of *Rissoa punctura*, *R. striata*, *R. costata*, and *R. cingillus*, also many juvenile *Phas. pulla*, *Cerith. reticulatum*, *Turritella communis*, and *Trochus cinerarius*.—R. STANDEN, Manchester.

FISHES.

A new Species of Ray (Raja blanda) from Irish waters. In the *Journal of the Marine Biol. Assoc.* (n. s. vol. iii. No. 3, 1894), Mr. Holt describes a new species of Ray, which he met with first on the west

coast of Ireland. The species is now described from North Sea specimens, as a complete series of Irish examples could not be obtained at the time. *Raia blanda* is closely allied to *Raia maculata*, but is much larger and differs from it in some other important respects. The eye is smaller, the teeth are also smaller and more numerous, but the distance between the snout and the coracoid is greater in *R. blanda* than in *R. maculata*. The latter never attains anything like the same development of the asperities of the upper surface as is present in half-grown *R. blanda*.

Beaumaris Shark in Dublin Bay.—On 1st November a shark was caught just outside Dublin Bay in a trawler's net, and was exhibited at Messrs. Powell's shop, Rathmines-road. It proved to be a large specimen of the Porbeagle or Beaumaris Shark, *Lamna cornubica*. It was about seven and a half feet long. Unfortunately it was sent away to the manure works before I had an opportunity of dissecting it, but I secured one of its characteristic teeth, which are lanceolate, with a small basal cusp on each side. The Porbeagle is occasionally taken on different parts of the Irish coast. The only one I can find previously recorded from Dublin Bay was one taken in 1838, forty-five inches long, and described by Mr. William Thompson. The usual length is about four feet. They feed chiefly on fishes.—J. E. DUERDEN, Dublin.

REPTILES.

Snake Cannibalism.—Apropos of the snake-swallowing incident which recently took place, I once witnessed a similar event at the Zoo in London. Whilst watching the serpents feed I noticed two attack the same frog—they each got hold of a back leg and commenced swallowing same slowly. By and bye, the noses of the serpents met, and one gradually went into the mouth of the other. After a little while the frog escaped, but the less fortunate serpent kept on its slow movement down the throat of the other. At this point I called the keeper's attention to it; and he at once opened the cage and pulled them asunder. Neither serpent seemed any the worse, but forthwith attacked separate frogs which they duly devoured.—JAS. BRANDRETH, Dublin.

BIRDS.

Grey Phalarope (*Phalaropus fulicarius* Linn.) at Inch, Lough Swilly. On 26th October Mr. M'Connell shot a Grey Phalarope which he sent to me for identification. This is the only occurrence I have noted in this district since October, 1891.—D. C. CAMPBELL, Londonderry.

GEOLOGY.

The Geology of Killarney.—In a paper by Mr. C. White (*Brit. Nat.*, August and September, 1894), the scenery and geological features of the Irish lake district are ably and lucidly discussed. The writer passes in review the various rocks of the region, and shows how by upheaval, denudation, and glaciation, he believes the present features of the scene which so delight all visitors have been produced.

The Jarroo Coalfield.—Mr. T. H. Bolton contributes to the current volume of the *Trans. Manchester Geological Society* (vol. xxii., p. 613), a valuable description of plant and fish remains from this coalpit in Co. Kilkenny, figuring *Myriolepis hibernica*, a species described by Dr. Traquair. He notices that the anthracite of the region does not rest on fire-clay, but on a black shale, and concludes that it represents the overflow of a peaty lagoon.

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